

**AN INVENTORY OF THE SIGNIFICANT NATURAL AREAS
OF SCOTLAND COUNTY, NORTH CAROLINA**

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On behalf of the members of the North Carolina Sandhills Conservation Partnership (NCSCP), the U.S. Fish and Wildlife Service would like to thank the Department of Defense Legacy Program for its 2002 funding to the Army Environmental Center. DoD Legacy Resource Management Program funded several important projects that generated critical data used to formulate a Conservation Reserve Design for the North Carolina Sandhills. In particular, we acknowledge the DoD Legacy Program's contribution to the completion of two Natural Community Inventories for Hoke and Scotland Counties, the construction of a region-wide GIS database housing over 300 data layers, the first comprehensive red-cockaded woodpecker regional database for the Sandhills, research to determine habitat requirements for two federal species of concern and, the development of a 2000 land cover dataset for the Sandhills. All the information generated from these projects is now available to our partners and other stakeholders in the NCSCP which include the Army Environmental Center and Fort Bragg. Without the support of the DoD Legacy Program, these projects and the invaluable information they provided would not have been possible.

Respectfully,

Peter V. Campbell
NC Sandhills RCW Recovery Coordinator
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ABSTRACT

This inventory of the significant natural areas, natural communities, and rare species of Scotland County was funded by the North Carolina Natural Heritage Trust Fund and by the U.S. Fish and Wildlife Service. This report identifies the most significant natural areas in the county, describes their features, and documents all of the natural communities and rare species of plants and animals associated with them. Recommendations for management and protection of each of these sites is given. A total of 31 significant standard sites, and two large managed areas, are described. Both of the large managed areas – Sandhills Game Land and Camp Mackall Military Reservation – are Nationally significant for containing large numbers of rare species and exemplary examples of sandhills communities; previously identified natural areas within these managed areas are only briefly discussed in this report because they are already in conservation ownership and are not “newly-identified” or “newly-described” sites. Of the standard sites described here in detail, the only Nationally significant natural area is the McIntosh Bay Complex, a group of at least four clay-based Carolina bays. There are several State significant natural areas, a few of which are in private (or nearly all private) ownership and are not protected.

The county is fortunate that it lies in both the Sandhills region and the Southern Inner Coastal Plain region, with the former occupying roughly the northwestern half of the county. The latter region contains dozens to hundreds of Carolina bays, though most have long ago been cleared for agriculture or utilized for timber production. Relatively few intact bays exist in the county or in neighboring counties, and protection of them is urgent for both rare plant species and rare amphibians and reptiles. The sandhills region of the county contains the two large managed areas and thus has much protected land already. However, because of the very large number of relatively rare species of plants and animals, some restricted to the sandhills area of the Carolinas, and the alarming decline in acreage rangewide of the longleaf pine and its associated habitats, protection of remaining sandhills habitats, along with prescribed burning on a several-year rotation, is also urgently needed. Lastly, the Lumber River (and its upper reach named Drowning Creek) and several of its tributaries provide important recreational opportunities and provide habitat for a wide array of plants and animals. Very little of the floodplains of the river and creeks (such as Juniper, Jordan, and Shoe Heel) are in conservation ownership. Thus, much work remains to be done in order to protect the best and most significant natural features of Scotland County.

ACKNOWLEDGMENTS

This inventory would not have been possible without the help of many agencies and individuals. First, I appreciate the Natural Heritage Trust Fund and the U.S. Fish and Wildlife Service for providing monies for this county inventory. The U.S. Fish and Wildlife Service also provided staff time for Pete Campbell and Susan Miller of their Sandhills office. They were very instrumental in providing me with landowner information, the data layer for Safe Harbor tracts, and other important assistance. I also received much valuable information from staff of the Sandhills office of The Nature Conservancy, especially Rick Studenmund and Dan Olstein. Richard Perritt of the Sandhills Area Land Trust, and Dickson McLean, of the Lumber River Conservancy, attended an initial inventory planning meeting in April 2003 and provided valuable insight about landowners and other aspects of conducting the inventory.

Various staff of the N.C. Natural Heritage Program were instrumental in bringing the inventory to completion. Judy Ratcliffe made numerous landowner contacts to request permission to survey tracts in the county. Kristen Sinclair assisted with preparation of maps and other aspects of the document. She, Bruce Sorrie, and Sarah McRae made valuable comments to drafts of the report. Sorrie also provided considerable botanical and other natural heritage information, especially as he was in the process of completing a county inventory in neighboring Hoke County. John Finnegan assisted in a two-day survey of several pools and ponds for amphibians and reptiles, as did Jeff Beane of the N.C. Museum of Natural Sciences.

N.C. Wildlife Resources Commission staff provided assistance during the inventory. Bill Parsons attended the initial planning meeting in April 2003, and as the chief wildlife forester of the Sandhills Game Land, he and his staff are commended for the excellent burn program that allows the game land to provide excellent habitat for game and nongame animal species and many hundreds of plant species.

I thank Clay Creed, land manager for Z.V. Pate, Inc., for allowing access to their lands in the county; and I also thank David Buhler, property manager of The Morgan Company, for accompanying me on a site visit to their lands in the county. Laura Fogo, of the Fish and Wildlife Service office based at Pee Dee National Wildlife Refuge, helped provide access to two tracts that their agency was considering for easements, and I thank both Helen Livingston and her son Jim for allowing access to one of those tracts being considered for an easement.

Staff of the Lumber River State Park provided canoes and transportation for a tour of a portion of the Lumber River. I also worked with their staff on several occasions to identify and protect portions of the Chalk Banks section of the park, which is undergoing development of facilities such as picnic areas and camping areas at the present time. Thanks in particular go to James Sessoms (superintendent of the park), Ron Anderson, Tom Howard, and John Taggart.

Lastly, I wish to thank the landowners who allowed me access to visit their lands in the county. Without such access, this inventory would have greatly limited information and would not accurately reflect the county's rich natural heritage.

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
DESCRIPTION OF THE STUDY AREA	3
Socioeconomic Features	3
Topography and Physiography	3
Geology and Soils	6
METHODS	9
Inventory Preparation	9
Ownership Research and Landowner Contact	9
Field Surveys	10
Evaluation of Site Significance	11
SUMMARY OF RESULTS	13
Natural Areas	13
Natural Communities	19
General Comments	19
Terrestrial Communities	22
Wetland Communities	23
Significant Plant Species	28
Significant Animal Species	35
DISCUSSION	42
Lands in Conservation Ownership	42
Priorities for Protection	43
Landowner Protection Options	45
BIOLOGICAL SURVEYS AND ENDANGERED SPECIES LAWS	48
Federal Law	48
State Law	49
REFERENCES	50
SITE DESCRIPTIONS	52
SANDHILLS GAME LAND [MANAGED AREA]	55
CAMP MACKALL MILITARY RESERVATION [MANAGED AREA]	61

	<u>Page</u>
SCOTLAND COUNTY SANDHILLS – NORTHWESTERN CLUSTER	65
NASHVILLE CHURCH ROAD SANDHILLS	71
ABERDEEN ROAD SANDHILLS	75
WILKES BRANCH SANDHILLS	79
OLD LAUREL HILL ROAD SANDHILLS	83
SCOTLAND COUNTY SANDHILLS – WESTERN CLUSTER	87
CURRIE ROAD/CRAWFORD LAKE ROAD SANDHILLS	91
HIGHLAND ROAD SANDHILLS	95
SCOTLAND COUNTY SANDHILLS – NORTHEASTERN CLUSTER	99
UPPER HILLS CREEK SANDHILLS	103
WATERY BRANCH SANDHILLS	107
NAOMI CHURCH SANDHILLS	111
HILLS CREEK ROAD SANDHILLS	115
HORSESHOE ROAD SANDHILLS	119
WAGRAM BORROW PIT AMPHIBIAN SITE	123
UPPER LUMBER RIVER CLUSTER	127
DROWNING CREEK/QUEWHIFFLE CREEK FLOODPLAIN	131
LUMBER RIVER/DROWNING CREEK FLATWOODS AND SWAMP	135
LUMBER RIVER/CHALK BANKS FLATWOODS AND POCOSINS	139
UPPER LUMBER RIVER SWAMP	143
LUMBER RIVER/BEAR SWAMP AQUATIC HABITAT	147
STAND-ALONE SITES (not within a cluster)	149
JUNIPER CREEK CEDAR SWAMPS	151
JORDAN CREEK FLOODPLAIN	155
RIVERTON ROAD BAY RIM	159
McINTOSH BAY COMPLEX	163
LITTLE JUNIPER CREEK BAY	167
SHOE HEEL CREEK FLOODPLAIN	171
SHOE HEEL CREEK SAND RIDGE	175
RICHMOND MILL NATURAL AREA	179
GREEN POND BAY RIM	183
LYTCH’S POND	187
JOHNS POND/LEITH CREEK SWAMP	191
SCOTCH MEADOWS BAY COMPLEX	195
GOOD NEWS BAY	199
STATELINE PRAIRIE BAY	203

APPENDIX. Megasites and macrosites in Scotland County.	205
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LIST OF TABLES

Table 1. Significant Sites in Scotland County.	15
Table 2. Natural Communities Present in Scotland County	20
Table 3. Rare Plant Species Known from Scotland County	29
Table 4. Rare Animal Species Known from Scotland County	36

LIST OF FIGURES

Figure 1. Cities, towns, and major roads in Scotland County.	4
Figure 2. Major hydrographic features in Scotland County.	5
Figure 3. Significant physiologic and geologic features in Scotland County.	7
Figure 4. Location of significant natural areas (standard sites) in Scotland County.	17
Figure 5. Location of significant natural areas (clusters A-D) in Scotland County.	18

INTRODUCTION

The primary objective of a natural area inventory is to identify the most significant natural habitats and locations of rare plants and animals in a particular region. An inventory should lead to protection of these important resources through recommendations for management and protection of the sites and the rare species locations. Considerable amounts of natural heritage inventory work have been conducted in Scotland County, though mostly in the Sandhills Game Land and in Camp Mackall, in the northwestern third of the county. Staff of the NC Natural Heritage Program and the NC Museum of Natural Sciences, in particular, have been surveying the region, mostly for rare plants and animals. Rare plant surveys have specifically been done for all of both Camp Mackall and the Sandhills Game Land; museum staff are primarily surveying for rare amphibians and reptiles. The part of the county outside the Sandhills has mostly been neglected in inventory work, other than one or two surveys done decades ago to determine the quality of clay-based Carolina bays remaining in North Carolina. However, no single-county inventory of natural areas has been conducted in Scotland County, even though such inventories have been recently been completed for neighboring Richmond County on the west and Hoke County on the northeast. (Robeson County, on the east, has not had a county-wide inventory.)

Because of the need to have up-to-date and thorough natural area inventories conducted in all counties of the state, and because of the great interest in protecting sandhill lands for the Federally Endangered red-cockaded woodpecker (*Picoides borealis*) and the multitudes of other rare animals, rare plants, and noteworthy natural communities, the North Carolina Natural Heritage Program (a state agency within the Department of Environment and Natural Resources) entered into an agreement with the U.S. Fish and Wildlife Service to conduct such an inventory. Funding was obtained from the N.C. Natural Heritage Trust Fund and from the Department of Defense Legacy Program through the U.S. Fish and Wildlife Service, for the Natural Heritage Program to conduct the inventory, which involved planning, landowner contact, inventory field work, and report preparation. The Nature Conservancy and the Sandhills Area Land Trust were also involved in the planning process.

The Natural Heritage Program's objectives are to identify and document the location and condition of North Carolina's best examples of natural ecosystems and to facilitate their protection. This Program is responsible for an ongoing statewide biological inventory of natural areas and rare plants and animals. The Program has sponsored systematic inventories for roughly 80% of the state's counties, as well as for national forest districts, state park units, imperiled natural community types, and rare species.

This report provides a framework from which conservation of the biological diversity of Scotland County can be effected. Though the county contains considerable public lands in the northwestern (= Sandhills) parts of the county, whereby the diversity of natural features is protected, there is little land protected in the remaining two-thirds (= Southern Inner Coastal Plain) of the county. It is hoped that the identification of the most significant natural resources in

the county in this report will lead to conservation of many if not most of the significant biological diversity of Scotland County. This conservation initiative will need the cooperation of the many landowners in the county, the various local and county governments, land trusts such as the Sandhills Area Land Trust and the Lumber River Conservancy, and state and Federal agencies.

DESCRIPTION OF THE STUDY AREA

Socioeconomic Features

Scotland County is one of the smaller counties in size in North Carolina, being only 320 square miles in size. It is roughly 25 miles long (north to south) and roughly 15 miles wide (east to west). It had a population of 35,998 people in the 2000 census, giving a population density of roughly 113 persons per square mile (of land area). The 1990 census was 33,763; thus, population growth in the county was a fairly modest 6.62% over the past 10 years. The estimated population on July 1, 2002 was 36,109 – a gain of roughly just 100 persons in the past two years.

The county has just a few incorporated towns (see Figure 1). Laurinburg, located just south of the center of the county, is the county seat; its population in 2000 was 15,874, indicating that nearly half of the county's population resides in this large town. The only other incorporated towns, all under 1,000 population, are Wagram, Gibson, and East Laurinburg; the only other town of note is Laurel Hill, which is unincorporated. Most of the county is in private ownership; however, much of the northern 15-20% of the county lies in public ownership. Most is Sandhills Game Land, owned by the State's Wildlife Resources Commission, whereas land in the extreme northern end of the county is in Federal ownership as Camp Mackall Military Reservation.

Topography and Physiography

Scotland County is located along the southern border of North Carolina. South Carolina bounds the county on the southwest for nearly 18 miles. The county lies in the western portion of the Coastal Plain province; the northwestern 35-40% lies in the Sandhills region of the Coastal Plain. This Sandhills region consists of quite rolling, hilly topography, whereas the remainder of the Coastal Plain, within the Southern Inner Coastal Plain region, is very flat, with little topographic variation.

A number of streams drain the county, though practically the entire county lies within the Lumber River drainage (see Figure 2). This river, as well as all streams in the county, are blackwater streams, with headwaters not reaching the Piedmont to the northwest. The extreme western tip of the county lies within the Pee Dee drainage. The Lumber River (and its upper end, called Drowning Creek) forms the eastern boundary of the county. Tributary streams generally run parallel to the Lumber and flow to the south or south-southeast. Other major streams (from east to west) include Big Shoe Heel Creek, Juniper Creek, Jordan Creek, Leith Creek, Gum Swamp Creek, and Joes Creek.

Scotland County contains hundreds if not thousands of Carolina bays. Nearly all of them are located within the Southern Inner Coastal Plain portion of the county (i.e., mainly northeast, east, and south of Laurinburg). A few are located along the edge of the Sandhills region, and a few

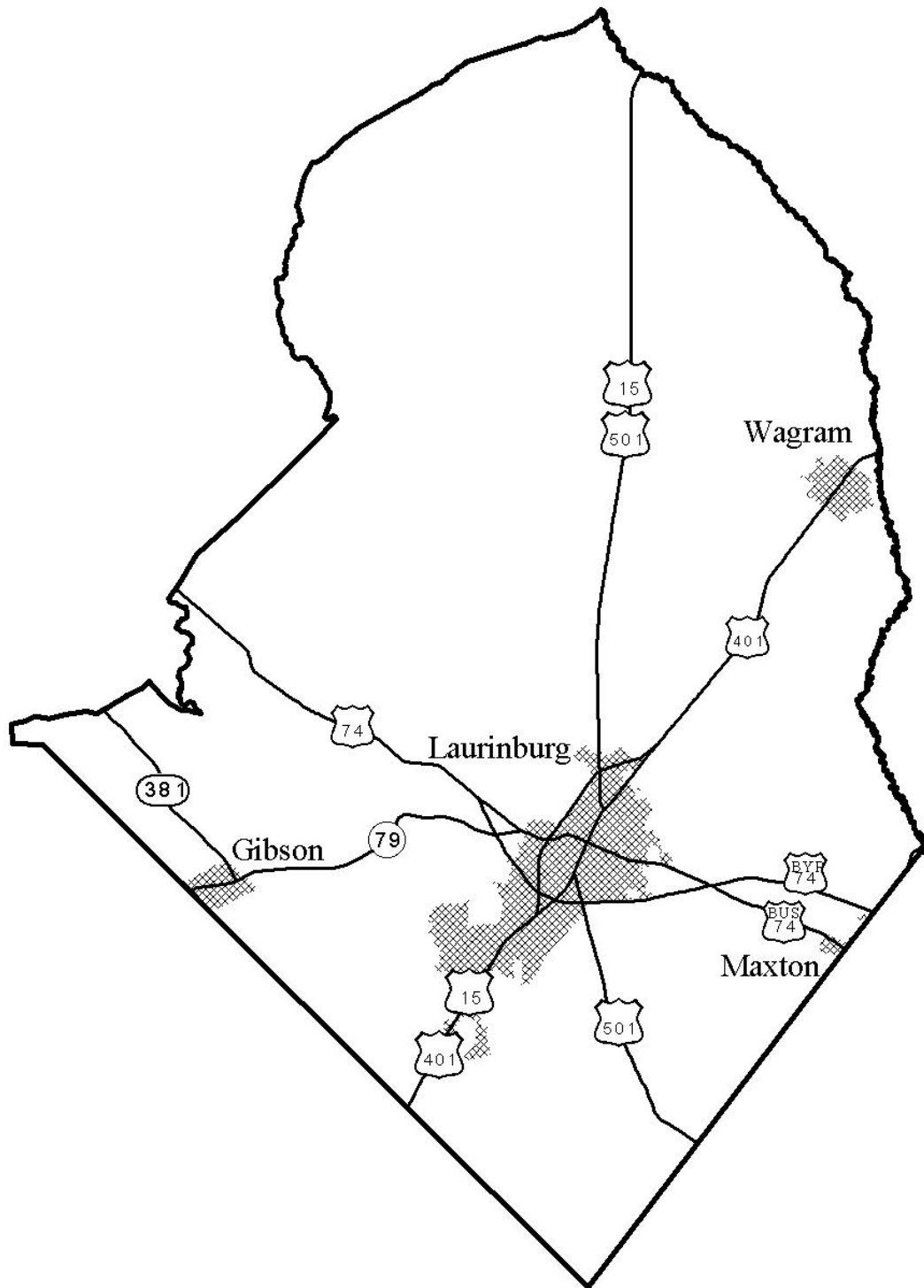


Figure 1. Cities, towns, and major roads in Scotland County.

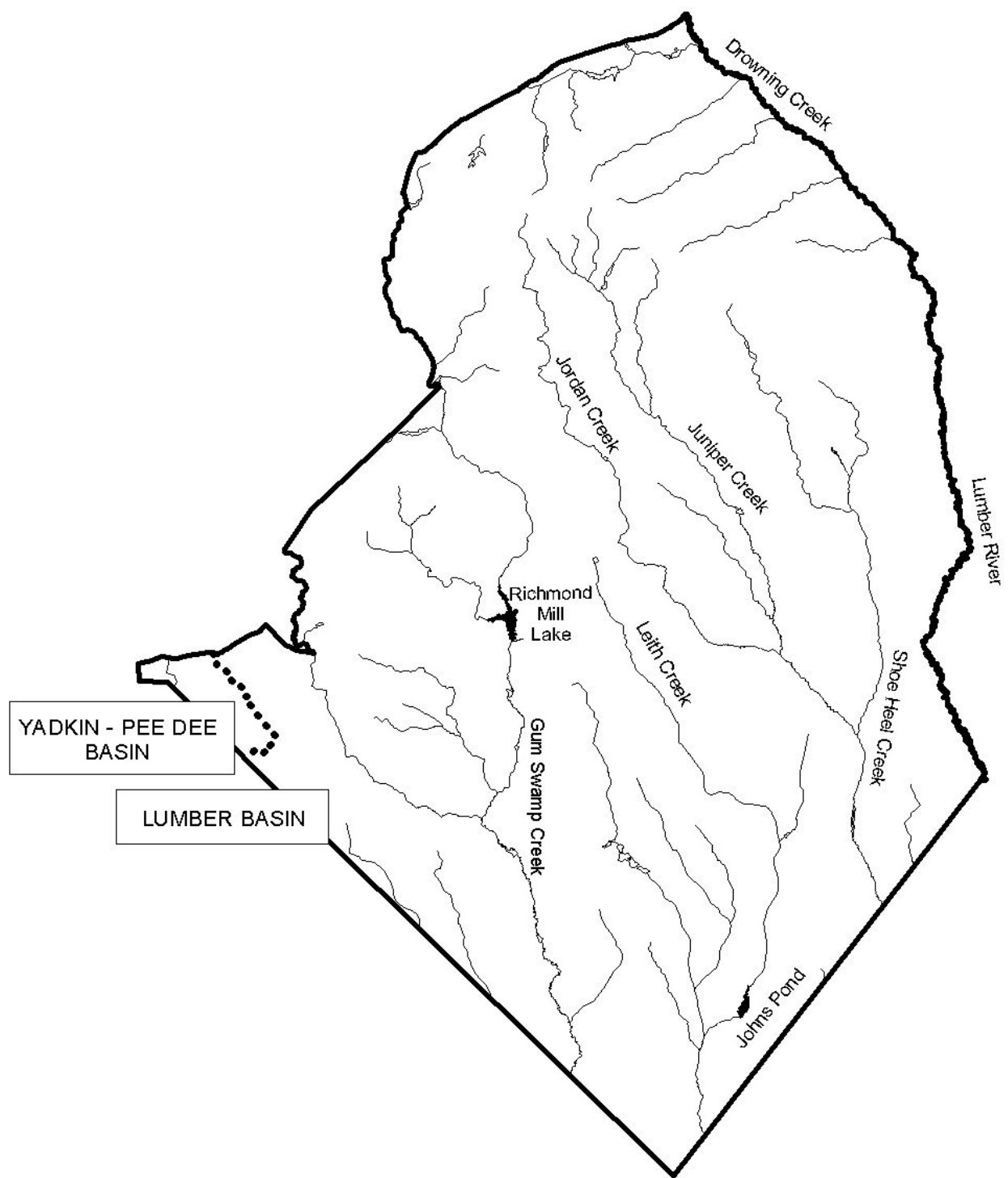


Figure 2. Major hydrographic features in Scotland County.

depressions of uncertain identity are present in the Sandhills. These elliptical depressions, some slightly over a mile in length, have their long axis running northwest-southeast. Though much speculation has been made about their origin, most scientists lean toward creation by wind action on bodies of water left behind as seas receded. These bays tend to have sandy rims, with the deepest sands along the southeastern margin. Most of the bays in Scotland County are clay-based; these are somewhat “hardpans” that are typically filled with one to several feet of water in the winter and spring, but may dry up completely, or sporadically, during the other months. During periods of drought, the bays may be completely devoid of water, even in winter. Peat-filled bays, commonly seen farther downstate, are very rare in Scotland County.

The county contains no natural lakes. However, there are a number of natural beaver ponds, and one or two bays, such as Laurinburg Pond, do hold water for most of the year as a natural pond. The county has a moderate number of millponds and other impoundments. Notable in the flat Coastal Plain portion are Richmond Mill Lake near Laurel Hill, and Johns Pond in the southeastern corner of the county. Small lakes in the Sandhills part of the county include Big Muddy Lake on Camp Mackall; Cameron Lake, Scotland Lake, Crawford Lake, and Gum Swamp Lake on the Sandhills Game Land; and Pine Lake on private property.

Most of the Sandhills region is forested and is thinly populated (or unpopulated in the Sandhills Game Land). However, much of the privately-owned portions have been clearcut, or are fire-suppressed. Relatively little exists in farmland, and most exist as pastures, as the soil is too sandy for most crops. However, the remainder of the county is a checkerboard of farmland and woodland, with relatively small areas of forest except along the streams. The streams are mostly swampland, with a scattering of clearcuts. Pine plantations dot the landscape but are not as extensive as in many counties in the Coastal Plain. Farmland – both cropland and rangeland – is abundant in the southeastern half of the county, and many of the Carolina bays have been cleared and are now farmed.

Geology and Soils

Scotland County’s geology at the surface consists of relatively young, sedimentary rock formations. The majority of the county contains rock of the Middendorf Formation (see Figure 3), from the Cretaceous Period. This consists of sand, sandstone, and mudstone, among others. Higher areas in the Sandhills region contain more recent Tertiary Period material – the Pinehurst Formation, which are mostly deep sands. Though most of the rock material was formed by sediment deposited in shallow seas, when the Atlantic Ocean was higher than it is today, the Pinehurst Formation likely consisted of sand deposited as large delta fans by streams that emptied into the ocean. Some of the sand deposits may also have been aeolian formations where river channels deposited sand on banks of the floodplain. But, whatever the origin of the sandhills, these sands are not known to contain marine fossils and thus were not simply formed as dunes alongside the shores of former coastlines; such dunes would likely be linear in shape, as well.

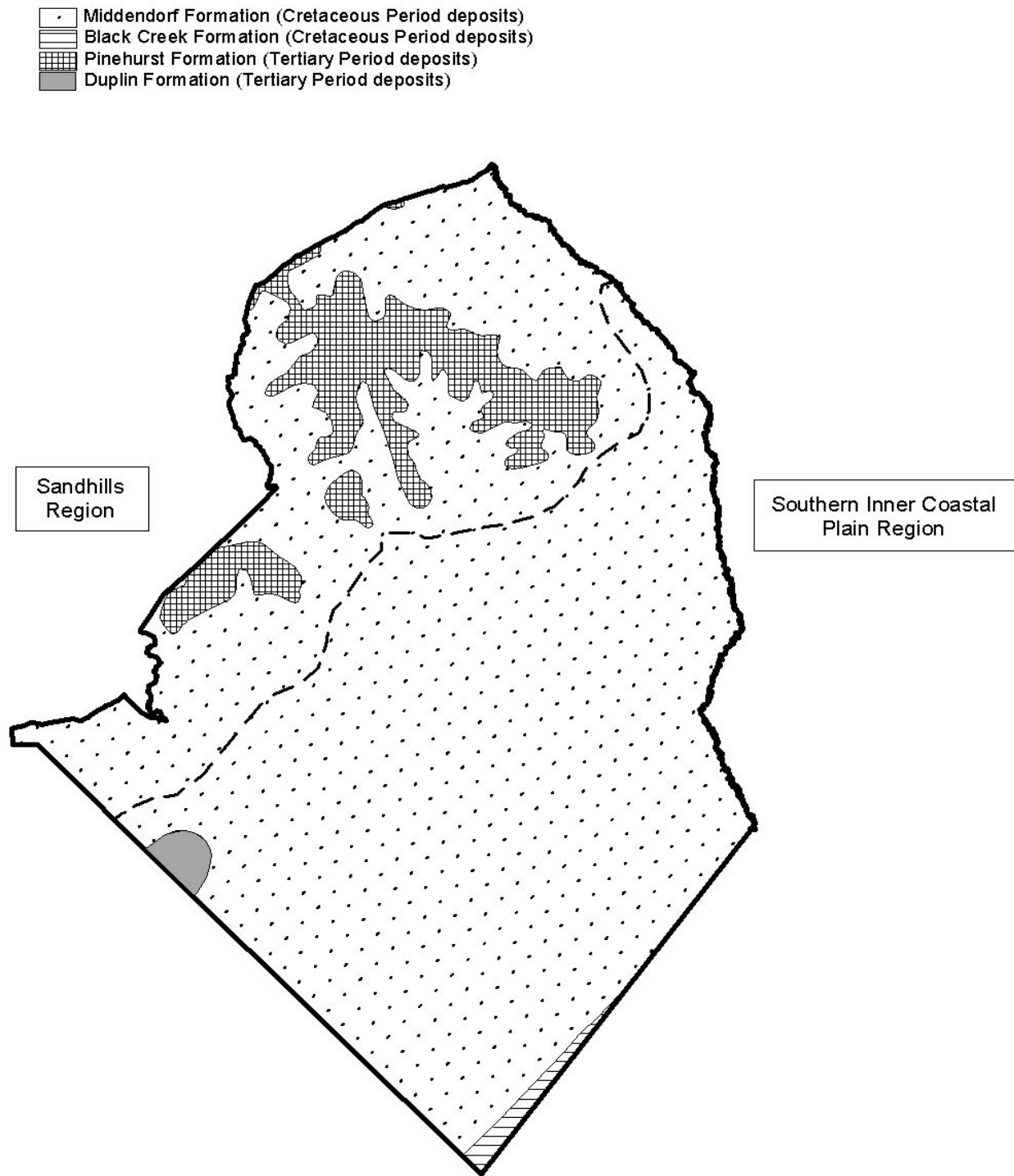


Figure 3. Significant physiologic and geologic features in Scotland County.

As indicated above, the soils in the northwestern half of the county are quite sandy in the uplands. The majority of these are Lakeland and Gilead soil series (i.e., the Lakeland-Gilead association [U.S. Department of Agriculture, 1967]), which are the deeper sands of the county. Most of the remainder of the county consists of the Marlboro-Norfolk-McColl association, which are well-drained soils on flat or gently sloping lands on uplands or in Carolina bays. The Eustis-Wagram-Kenansville association lies in the eastern part of the county and contains soils that are somewhat sandy but are better drained, or are more loamy, than are those of the Lakeland-Gilead association. A small area along the southern edge of the county, near the Robeson County line, is the Coxville-Dunbar-Duplin association, consisting of soils on broad flats in interbay areas or within Carolina bays. Lastly, the Lumbee-Johns-Okenee association consists of alluvial soils along the Lumber River and Gum Swamp Creek.

METHODS

Inventory Preparation

The methods employed in this inventory follow the guidelines established by the North Carolina Natural Heritage Program (hereafter, NC NHP), an agency in the Office of Conservation and Community Affairs within the Department of Environment and Natural Resources. The NC NHP maintains the state's primary database for rare plants and animals, high-quality natural communities, and outstanding natural areas. The focus of this inventory was the identification and description of outstanding natural areas, based on the identification of high-quality natural communities, and to a lesser extent based on the locations of rare plants and animals.

Preparation for the field work consisted of three main stages. First, the researcher -- Dr. Harry LeGrand, zoologist at the NC NHP -- collected and analyzed existing biological and physical information for Scotland County. Second, he identified areas with good potential for biological significance, based on various sources. Third, contacts with various agencies at the Conservation Center of the Sandhills -- the U.S. Fish and Wildlife Service, The Nature Conservancy, and the Sandhills Area Land Trust -- provided information about known or potentially significant areas and ownership information of the tracts. The first and second stages of the preparation work were done in the fall and winter of 2002 and early 2003, before the start of the field season in spring 2003. The third stage occurred during late winter and spring 2003, highlighted by a gathering of personnel from all key agencies and organizations at a meeting held in Southern Pines on April 23, 2003.

The majority of the existing biological information for the county was collected from the maps, files, and Biotics database at NC NHP. Soil and geologic maps were also reviewed. Locations of all known significant sites, high-quality natural communities, and rare species were drawn onto a set of all of the 1:24,000 scale U.S. Geological Survey topographic quadrangle maps covering Scotland County. Other information in the NC NHP files was also used, including site visits made by biologists in the early 1990's conducting natural area inventories on Camp Mackall (Russo et al. 1993) and rare plant surveys on the Sandhills Game Land (Russo et al. 1994, Sorrie 1998), and numerous visits made to the county (especially to the Game Land) by herpetologists with the North Carolina Museum of Natural Sciences.

Ownership Research and Landowner Contact

For each of the known or potentially significant natural areas identified above on topographic maps, LeGrand reviewed aerial photographs and the Scotland County parcel data layer on ArcView GIS, in order to refine the areas to be surveyed. He identified specific parcels on GIS that he wished to survey, and sent this parcel data layer, consisting of 18 sites and roughly 80-100 tracts, to Judy Ratcliffe, the NC NHP's inventory manager, in the summer of 2003. She contacted the landowners of the larger tracts by phone, though in some cases she sent letters to

ask for permission. Upon notification of approval for a survey, she notified LeGrand. She also provided him with GIS data for each tract, such as the owner's name and the tract acreage.

In most cases, LeGrand inventoried tracts without the landowner needing to accompany him. In a few cases, the landowner or land manager visited his or her tract with LeGrand. Several tracts were visited with the assistance of other persons making the necessary arrangements. For example, two tracts were visited with Laura Fogo of the U.S. Fish and Wildlife Service in the process of completing conservation easements with the landowners.

Field Surveys

Prior to the beginning of the landowner contact, LeGrand made some initial roadside visits to the county as early as March 2003. Two such spring 2003 visits were made to view the condition of Carolina bays from roads, though this process was somewhat frustrating in that the centers of the bays could not be seen (to determine if there was open water, open herbaceous zones, or simply solid forest) and that many bays were too far from roads to be seen. No such bays were entered, as close looks at aerial photos seemed to indicate a lack of open water or herbaceous zones in the bays.

LeGrand made a number of visits to public lands, or lands in private conservation ownership, during summer and fall 2003. Most of these were to the Sandhills Game Land, along the southern portions of the larger blocks that had not been well surveyed in various previous inventories, and to smaller and more isolated Game Land blocks. The first visits to privately-owned land, with landowner permission, took place in August 2003.

In the winter of 2003-04, LeGrand conducted roadside surveys of most river and large creek bridge crossings. Notes were taken on the composition and quality of the vegetation on all quadrants, as covering most such creeks would be impossible in a canoe or by foot.

It was not until spring 2004 that most visits to privately-owned lands were made. Field work continued into late 2004. In some cases, landowner contact was not made for key tracts, for various reasons. If the tracts appeared to contain significant natural features, as seen from aerial photos, LeGrand took notes from roads, or from the adjacent public lands. For example, the boundaries of the Sandhills Game Land are marked with orange-painted bands around trunks of trees along the boundaries, and there is usually a narrow surveyor path along the boundary line. Notes were taken on a number of privately-owned tracts that bound the Game Land by LeGrand walking along the boundary line. In a few cases, where such tracts were away from roads or public lands, only review of aerial photos could be used to identify tracts for inclusion. Such was often the case for identifying the boundaries of river and creek floodplains, where it is time-consuming and somewhat difficult to survey swamps from the ground.

Only terrestrial species and natural communities were surveyed in this inventory. Fortunately, considerable information is already known about the fauna of the larger rivers and streams in the county from previous survey work by various state and Federal agencies. Had not such previous information been available, it might have been strongly recommended that an aquatic survey coincide with the terrestrial survey such that results from both could be reported in a single inventory document. Nonetheless, in Scotland County there is a lack of rare species records of many invertebrates groups, and aquatic surveys likely would have revealed a few rare species.

The primary information collected in the surveys included the quality, composition, and location of natural community types; population size, threats, and locations of rare plant populations and rare animal populations; and site boundaries and integrity of sites. Surveys were done in a walk-through fashion, taking notes on most of the plant species and all of the animal species noted. However, one survey along the Lumber River was conducted by canoe, and thus notes were taken while in the canoe, except for a few instances of landing onshore and taking notes while on land. Surveys of small sites were done in a few hours, whereas several sites were so large (several thousand acres) that the field work required several days, scattered over the field season. Rare plant and rare animal forms were completed for each such species recorded on the surveys. A detailed Site Survey Form was completed for each site considered significant enough to be included in the final inventory report; these forms are part of the NC NHP database.

Evaluation of Site Significance

The significance of sites (also called "natural areas" in this report) was evaluated using a standard system employed by NC NHP, as well as by The Nature Conservancy. One of four significance rankings is assigned to each site. Factors involved in the evaluation include the rarity, quality, and condition of the natural communities present; rarity, vigor, and population size of rare species present; size of the site; and geographical relationship of the elements (natural communities and species) to other similar elements in the surrounding counties and regions. The sites were compared to sites with similar attributes in the county, the region, the state, or nation to determine their significance. After each significance level was assigned, it was subject to internal review and possible revision by other biologists at NC NHP. The site significance levels used are:

National Significance – Considered to contain examples of natural communities, rare plant or animal populations, or other significant ecological features that are among the highest quality or best (top five or six) examples of their kind in the nation.

State Significance – Considered to contain examples of natural communities, rare plant or animal populations, or other significant ecological features that are among the highest quality or best (top five or six) examples of their kind in North Carolina, after nationally significant examples. There may be comparable (or more significant) sites elsewhere in the nation or within the state.

Regional Significance – Considered to contain examples of natural communities, rare plant or animal populations, or other significant ecological features that are represented elsewhere in the state by better examples, but which are among the highest quality or best (top five or six) examples in their geographic region of the state. Normally, the geographic region is considered to include the counties immediately surrounding the county where the site is located.

County Significance – Considered to contain significant biological resources at the county level, but which do not rank at the regional (or higher) level.

SUMMARY OF RESULTS

Natural Areas

A natural area is a site that contains one or more good- to excellent-quality natural community types that form a distinct geographical unit. A natural community is "a distinct and reoccurring assemblage of populations of plants, animals, bacteria, and fungi naturally associated with each other and their physical environment" (Schafale and Weakley 1990). Natural areas often contain rare plants and animals, as well. Natural areas are also referred to in this report as "sites" or "significant sites".

In a few cases, locations of rare plant or animal populations may merit protection where not present in high-quality natural communities. For example, a borrow pit or a powerline clearing would certainly not be considered as a "natural area", as these habitats are greatly impacted by humans. But, rare species can be present in such habitats because they often "mimic" rare natural habitats such as limesink ponds or savannas, and they are present in such altered places in Scotland County. These sites are included in this report and, combined with more natural sites, collectively all sites identified in this inventory are considered as "significant natural heritage areas". Thus, the addition of the word "heritage" indicates that a site or area has important natural heritage features (natural communities, rare plants, and/or rare animals), but is not necessarily a relatively undisturbed "natural area". Nonetheless, the phrase "natural area" is better understood by the public and is used in most of this report (e.g., in this heading and in the title of this inventory), though it must be emphasized that not all of the areas are completely natural.

This report also distinguishes between the nesting of sites within larger sites. Unless otherwise indicated, a site in this report is a "standard site" (see Figure 4). Such a site can range in size from less than an acre to thousands of acres. The NC NHP often groups collections of closely located standard sites into larger sites called "macrosites", and collections of macrosites in "megasites" (see Appendix). In this inventory report, collections of closely located, or similar, sites are grouped into a larger site called a "cluster" (see Figure 5), as such a grouping tends to differ slightly from what the NC NHP has delineated. (For example, all of the Scotland County portion of the Sandhills area is incorporated into one macrosite by NC NHP, as distinguished from another Sandhills macrosite west of US 1 in Richmond County.) The NC NHP's Lumber River Macrosite stops short (upstream) of where the Upper Lumber River Cluster is located in this inventory, which pulls the cluster upstream to Camp Mackall. The inventory also identifies and describes two large managed areas – Sandhills Game Land and Camp Mackall. They are not to be considered as clusters or as macrosites or megasites; rather, they are included to describe the overall significance of these publicly-owned lands, regardless of size, shape, or other features.

For a small county, Scotland County contains a large percentage of land within the boundaries of identified natural areas, thanks mainly to the Sandhills Game Land and to a lesser extent Camp Mackall. This inventory identifies a total of 31 standard sites in the county that contain

biological significance at least at the county level, as shown on Table 1 and on Figures 4 and 5. This number does not include several sites already identified within these two large managed areas, in part because they have already been identified by NC NHP.

The Sandhills Game Land and Camp Mackall are both of National significance, and a few newly-identified sites within the Game Land are identified as being of State significance. The only other site of National significance in the county is the McIntosh Bay Complex, a group of at least four clay-based Carolina bays in good to excellent condition.

State-significant sites are scattered across the county. Collectively, the Upper Lumber River Cluster is State significant. Several individual sites are State significant within this cluster – the Upper Lumber River Swamp and the Lumber River/Bear Swamp Aquatic Habitat (which has most of its significance in the Robeson County part of the site). Away from the river, there is a State-significant site in the southwestern corner, at the Green Pond Bay Rim. And, the extreme southern part of the county has a State-significant site at Stateline Prairie Bay, which lies partly in South Carolina.

As one would expect, there are more Regionally-significant sites than State-significant ones, and these are located all around the county. There are a handful of privately-owned sites located adjacent to the Sandhills Game Land that contain good to excellent sandhills vegetation, in considerable acreage. These are the Aberdeen Road Sandhills along US 15-501, the Highland Road Sandhills along the southern boundary of Block C, and the Naomi Church Sandhills, lying alongside Hills Creek Road. Perhaps the most significant Regional site, arguably of State significance, is the very large expanse of the upper terrace of the Lumber River within the Lumber River/Chalk Banks Flatwoods and Pocosins natural area, lying generally between the Game Land and the Chalk Banks portion of Lumber River State Park. Another area of essentially all private land, lying adjacent to the Game Land and just below Camp Mackall, is the Drowning Creek/Quewhiffle Creek Floodplain. Lastly, the Wagram Borrow Pit Amphibian Site is located northwest of Wagram, close to the Game Land; it is owned by the N.C. Department of Transportation.

Farther south, away from the Sandhills Game Land, are several significant clay-based Carolina bays. The Riverton Road Bay Rim lies in the extreme eastern part of the county, and two small sites with bays – Scotch Meadows Bay Complex and Good News Bay – both lie within a few miles of the South Carolina state line. These latter two sites have had name changes from that used in the past by the NC NHP; Scotch Meadows Bay Complex was formerly known as Chorus (Kneedeep) Bay, and Good News Bay was formerly known as Rhexia (Goodnews) Bay. The Juniper Creek floodplain, named here as Juniper Creek Cedar Swamps (to avoid confusion with a site called “Juniper Creek Floodplain” in Brunswick and Columbus counties), is located close to the center of the county, north of Laurinburg. And, west of that town is the moderately large site identified as the Richmond Mill Natural Area, which contains the large Richmond Mill Lake and surrounding forests.

Table 1. Significant Sites in Scotland County*. Sites are grouped by cluster areas, and generally arranged from north to south. The two large managed areas are listed separately, followed by the four cluster areas, followed by sites that do not fall within these clusters. Newly-identified standard sites in this inventory are indicated by a plus (+). The approximate percentage (by GIS inspection) of the site in conservation ownership is given in the final column; approximate percentage of the site in the US FWS Safe Harbor Program is given in parentheses. Site Significance: A = National, B = State, C = Regional, D = County.

Site Number	Site Name	Site Signif.	% Conservation Land/Owner
I.	Sandhills Game Land [Managed Area]	A	100/WRC
II.	Camp Mackall Military Reservation [Managed Area]	A	100/DOD
A.	Scotland County Sandhills – Northwestern Cluster	A	90/WRC/DOD
1.	Nashville Church Road Sandhills +	C	100/WRC
2.	Aberdeen Road Sandhills	C	5/WRC
3.	Wilkes Branch Sandhills +	D	0 (45)
4.	Old Laurel Hill Road Sandhills +	D	0
B.	Scotland County Sandhills – Western Cluster	A	95/WRC
5.	Currie Road/Crawford Lake Road Sandhills +	B	98/WRC
6.	Highland Road Sandhills +	C	0
C.	Scotland County Sandhills – Northeastern Cluster	A	90/WRC/DOT
7.	Upper Hills Creek Sandhills +	C	95/WRC
8.	Watery Branch Sandhills +	B	95/WRC (2)
9.	Naomi Church Sandhills +	C	35/WRC
10.	Hills Creek Road Sandhills +	D	45/WRC (20)
11.	Horseshoe Road Sandhills +	D	100/WRC
12.	Wagram Borrow Pit Amphibian Site	C	100/DOT
D.	Upper Lumber River Cluster	B	15/WRC/DPR
13.	Drowning Creek/Quewhiffle Creek Floodplain	C	0 (15)
14.	Lumber River/Drowning Creek Flatwoods and Swamp	C	95/WRC
15.	Lumber River/Chalk Banks Flatwoods and Pocosins +	C	10/DPR
16.	Upper Lumber River Swamp	B	5/DPR/WRC
17.	Lumber River/Bear Swamp Aquatic Habitat	B	100/PW

Table 1. (Continued)

Site Number	Site Name	Site Signif.	% Conservation Land/Owner

Stand-alone Sites [not within a cluster]			
18.	Juniper Creek Cedar Swamps +	C	25/WRC/E-FWS
19.	Jordan Creek Floodplain +	D	0
20.	Riverton Road Bay Rim +	C	0
21.	McIntosh Bay Complex	A	47/TNC
22.	Little Juniper Creek Bay +	D	0
23.	Shoe Heel Creek Floodplain +	D	0
24.	Shoe Heel Creek Sand Ridge +	D	0
25.	Richmond Mill Natural Area +	C	0 (95)
26.	Green Pond Bay Rim	B	0
27.	Lytch's Pond +	D	0
28.	Johns Pond/Leith Creek Swamp +	D	35/E-FWS
29.	Scotch Meadows Bay Complex +	C	0
30.	Good News Bay	C	0
31.	Stateline Prairie Bay	B	80/TNC

Conservation Owner:

DOD = U.S. Dept. of Defense

DOT = N.C. Dept. of Transportation

DPR = N.C. Division of Parks and Recreation

E-FWS = easement to U.S. Fish and Wildlife Service

PW = N.C. Public Waters

TNC = The Nature Conservancy

WRC = N.C. Wildlife Resources Commission [Sandhills Game Land]

* The Sandhills Game Land and Camp Mackall managed areas contain many standard sites previously identified by NC NHP but not listed in the table, nor described in detail in this report, because they are completely within conservation land ownership. These previously identified sites are briefly described within the appropriate cluster area: Camp Mackall sites within the Scotland County Sandhills – Northwestern Cluster, and the Sandhills Game Land sites within one of the four clusters. The sites listed in the table (and described in the report) for these four clusters are ones that (1) contain some or all private land and thus are not fully in conservation ownership, or (2) are completely within the Game Land but which have not been well studied and described previously and which lie adjacent to private land that could be added to the Game Land in the future.

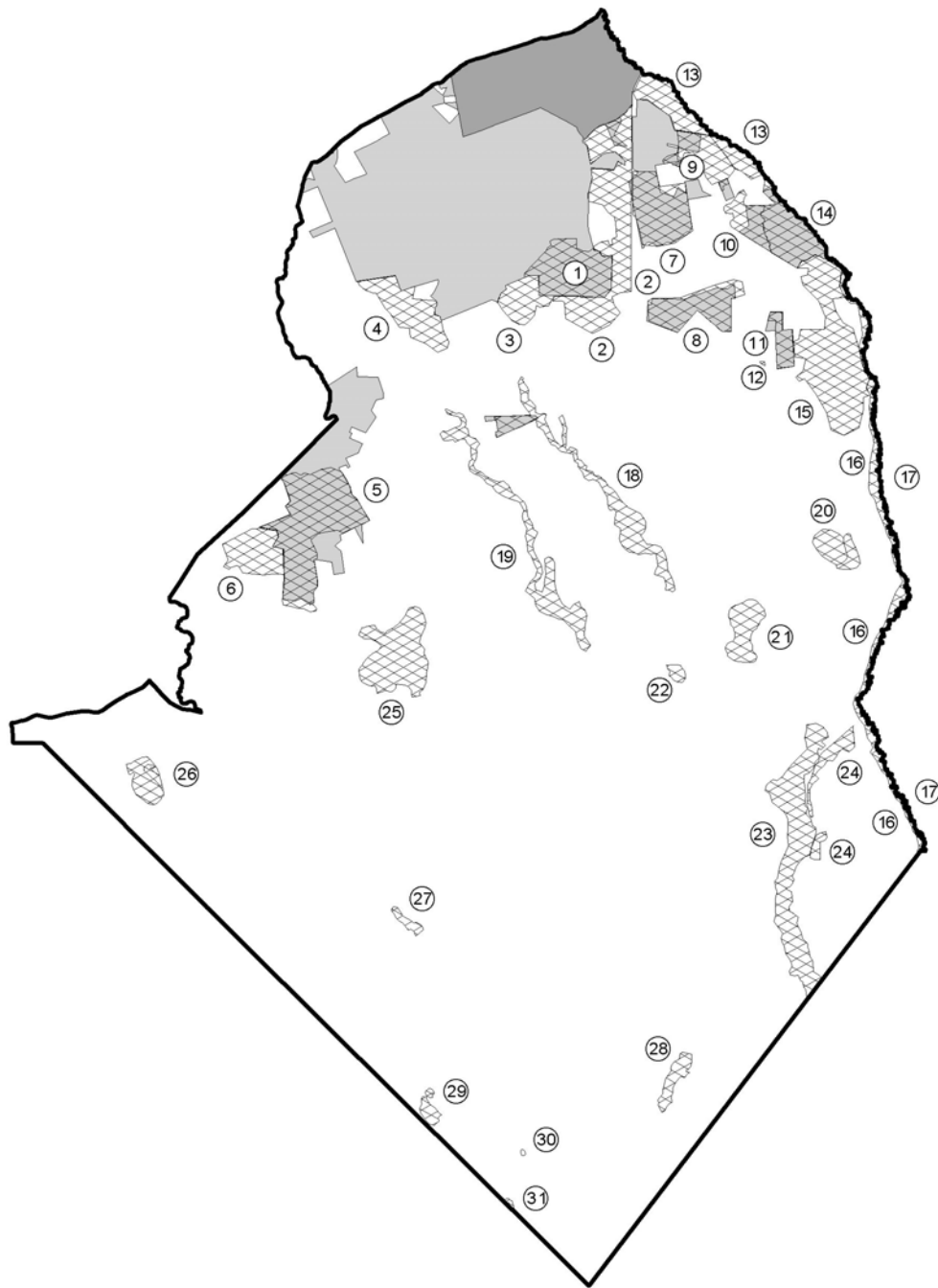


Figure 4. Locations of significant natural areas (standard sites) in Scotland County. Standard sites are crosshatched. Dark gray shading (top of county) is Camp Mackall Military Reservation; lighter gray shading is Sandhills Game Land.

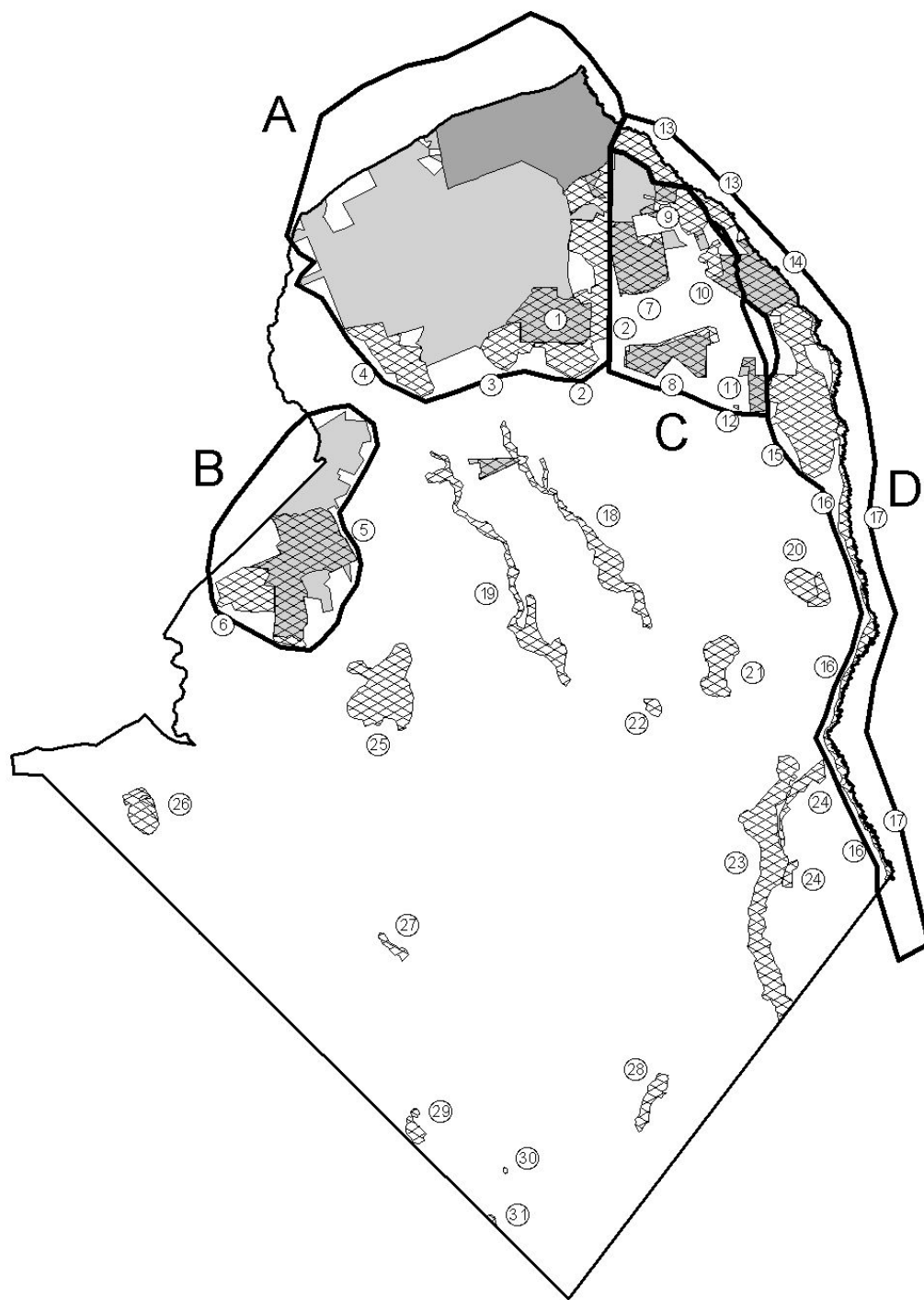


Figure 5. Locations of significant natural areas (clusters A-D) in Scotland County. Standard sites are crosshatched. Dark gray shading (top of county) is Camp Mackall Military Reservation; lighter gray shading is Sandhills Game Land.

Sites of county significance include the array of natural features in the county, ranging from sandhills vegetation, to mill ponds, to creek floodplains, to Carolina bays. In fact, there are probably a number of other Carolina bays within the county of at least County significance, but not surveyed due to lack of access or time. Needless to say, quite a few other sites could have been identified of County significance, given more time and effort.

Natural Communities

General Comments

A natural community is defined by the NC NHP as a “distinct and reoccurring assemblage of populations of plants, animals, bacteria, and fungi naturally associated with each other and their physical environment” (Schafale and Weakley 1990). In this inventory, most of the significant natural areas were identified on the basis of natural communities, rather than on the basis of rare plant or rare animal locations and habitats. Unlike plant and animal species, however, natural communities can be “in the eye of the beholder”. They are not distinct entities clearly demarcated from other communities. Different ecologists classify communities in different ways, some by the dominant species (such as trees), other by topography, soils, and other factors. Even once a classification has been agreed upon, different biologists may interpret the same piece of land as different communities! In addition, communities are significant mainly in a rather mature condition, and some might not be recognizable immediately after being logged. Some communities require active burning to be maintained. Long periods of fire suppression (such as 50 years or more) may “convert” one natural community type to another.

Natural communities constantly “transition” with others, especially where the topography is steep or where soil and rock types vary in close proximity. A steep slope may have three or four natural communities arranged from the base of the slope to the top of the slope. In other cases, communities may blend, such that features of at least two communities can be seen on the same piece of ground. For example, small streams that occur in the Neuse River floodplain (a brownwater floodplain) generally carry little sediment, and are probably blackwater streams. Yet, the natural communities along such streams are often a blending of blackwater and brownwater communities.

Approximately 25 types of natural communities are identified in this inventory for Scotland County (see Table 2), based on the types, subtypes, and variants described in Schafale and Weakley (1990) and Schafale (in prep.). However, several of these are marginal-quality examples or represent uncertain identification. This is a respectable number of communities for a small-sized county, in part because the county contains both Sandhills and non-Sandhills communities in the Coastal Plain.

The following is a brief overview of the natural communities found in Scotland County. Detailed descriptions of the vegetation typical for a given community can be found in Schafale

Table 2. Natural Communities Present in Scotland County. Communities are listed in an ecological manner, generally from dry to wet conditions and nonalluvial/peatland to riverine systems. Numbers and Roman numerals in the "Significant Sites" column refer to Site Numbers for natural areas described in this inventory. Community types and subtypes are from Schafale and Weakley (1990), except where marked by an asterisk (*), which are proposed types in an update of this publication.

Natural Community	Global State		Significant Sites
	Rank	Rank	

TERRESTRIAL			
Sand Barren *	G2	S2	20, 26
Xeric Sandhill Scrub	G5	S4	I, II, 2, 5, 8, 10, 20, 26
Pine/Scrub Oak Sandhill (Mixed Oak variant)	G4	S3	I, 2, 6, 7, 8, 10, 11, 14, 15, 20, 24, 25, 26
Pine/Scrub Oak Sandhill (Blackjack variant)	G4	S2	I, II, 5
Pine/Scrub Oak Sandhill (Mesic Transition variant)	G4	S2	I, II, 1, 5, 6, 7, 8
Mesic Pine Flatwoods	G5	S3	I, 5, 15, 26
PALUSTRINE – nonalluvial/peatlands			
Cypress Savanna (Typic variant)	G2G3	S2	21
Cypress Savanna (Depression Meadow variant)	G2G3	S2	21, 29, 30, 31
Coastal Plain Depression Swamp *	GU	SU	22, 29
Wet Pine Flatwoods	G3	S3	I, 7, 9, 10, 11, 14, 15
Peatland Atlantic White Cedar Forest	G2	S2	I, 14
Streamhead Atlantic White Cedar Forest	G3?	S2	I, 18
Sandhill Seep	G2	S2S3	I, II, 2, 3, 5
Streamhead Pocosin	G4	S3	I, II, 2, 4, 5, 7, 8, 10, 18
Pond Pine Woodland	G4G5	S4	I, 11, 13, 14, 15, 18
High Pocosin	G4	S4	15, 22
Small Depression Pocosin	G2?	S3	I, II, 7, 9, 18
Vernal Pool	G3	S2S3	I, 6, 7, 8
PALUSTRINE – river floodplains			
Sand and Mud Bar	G5	S5	16
Cypress-Gum Swamp (Blackwater subtype)	G5T5	S5	I, II, 13, 14, 16, 23, 28
Coastal Plain Bottomland Hardwoods (Blackwater subtype)	G5T5	S3	I, II, 13, 16
Coastal Plain Levee Forest (Blackwater subtype)	G5T4	S3	16
Coastal Plain Small Stream Swamp (Blackwater subtype)	G5	S5	I, II, 18, 19, 23, 25
Coastal Plain Semipermanent Impoundment	G5	S4	I, II, 5, 19, 25, 27, 28

EXPLANATION OF RANK CODES

Global Rank:

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals) or because of some factor(s) making it especially vulnerable to extinction.

G2 = Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single physiographic region) or because of other factors making it vulnerable to extinction throughout its range; in the range of 21 to 100 occurrences.

G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

GU = Status uncertain; need more information to rank.

T_ = The rank of a subspecies or variety. As an example, G4T1 would apply to a subspecies of a species with an overall rank of G4, but the subspecies warranting a rank of G1.

State Rank:

S1 = Critically imperiled in North Carolina because of extreme rarity (5 or fewer occurrences or very few remaining individuals) or because of some factor(s) making it especially vulnerable to extirpation from North Carolina.

S2 = Imperiled in North Carolina because of rarity (6 to 20 occurrences or few remaining individuals) or because of some factor(s) making it very vulnerable to extirpation from North Carolina.

S3 = Rare or uncommon in North Carolina (on the order of 21 to 100 occurrences).

S4 = Apparently secure in North Carolina, with many occurrences.

S5 = Demonstrably secure in North Carolina.

SU = Status uncertain; need more information to rank.

and Weakley (1990), as well as in the individual site descriptions. This summary highlights the general geographic location, topographic position, and relative abundance of each community in the county, along with comments on related communities. The communities are arranged by moisture content, with terrestrial sites listed first, followed by wetland ones.

Terrestrial Communities

Sand Barren. This natural community was incorporated as a variant of the following natural community, Xeric Sandhill Scrub, in Schafale and Weakley (1990); however, it has been elevated to a natural community by the NC NHP in recent years (M. Schafale, pers. comm.). This is a rather limited natural community in size, with relatively few sites in the county. It typically occurs over very deep sands of Carolina bay rims, particularly on the southeastern rim of such bays. The longleaf pine (*Pinus palustris*) canopy is usually open and may be stunted. Scrub oak species, especially turkey oak (*Quercus laevis*), may be common in the understory; however, this community is distinguished by open areas of bare sand and a distinctive herb layer. Some of these herbs are not commonly found in the more typical sandhills communities below; such forbs include eastern prickly-pear (*Opuntia humifusa*), wireplant (*Stipulicida setacea*), sandwort (*Arenaria caroliniana*), and October-flower (*Polygonella polygama*). The only known state locale for Michaux's whitlow-wort (*Paronychia herniarioides*) occurs in this community, at Green Pond Bay Rim (Site 26).

Xeric Sandhill Scrub. This is a very common natural community in the Sandhills region of the county, and it is also present in the Southern Inner Coastal Plain region, as well. It occurs on the driest and sandiest soils in the Sandhills region, and it also is present locally in the Southern Inner Coastal Plain region. The understory of the community is dominated by turkey oaks – often 100% of the understory -- beneath a canopy of longleaf pines. Few other species are present, with dwarf huckleberry (*Gaylussacia dumosa*) being the dominant shrub. Wiregrass (*Aristida stricta*) may be common, but it is usually better developed in other communities. Typical herbs include goat's-rue (*Tephrosia virginiana*) and sandhills wild indigo (*Baptisia cinerea*).

Pine/Scrub Oak Sandhill. This ubiquitous community combines with the previous one to comprise nearly all of the uplands in the Sandhills region. In the Southern Inner Coastal Plain region, it is locally common. It occurs in somewhat more loamy or less xeric sandy soil than does the former community; and it contains a mix of scrub oaks such as turkey oak, scrub post oak (*Q. margaretta*), bluejack oak (*Q. incana*), and blackjack oak (*Q. marilandica*), beneath a canopy of longleaf pines. The shrub and herb layers are usually more diverse than in the previous community; diversity of grasses and composites can be fairly high, at least where frequently burned. Several variants (Schafale and Weakley 1990, Schafale 1994) have been described, and three are present in the Sandhills region (and in the county). The Mixed Oak variant is the most numerous and “typical” variant in the county, usually with a fairly even mix of at least three of the four oaks above and with a modest ground layer diversity. The Blackjack variant features slightly more clay in the soil than the previous variant, and blackjack oak is the

dominant oak species. It has a modest herb layer also. It is not a common type in the county, and ecologists often “overlook” the variant in favor of the much more significant and diverse Mesic Transition variant, which occurs in somewhat loamy soil and is usually found in gentle swales or in flats. The herb diversity is very rich, and bluejack oak is generally the most common of the scrub oaks. It is less common than the Mixed Oak variant and about as numerous as the Blackjack variant. The “transition” in the name indicates a closeness with the Mesic Pine Flatwoods natural community, where scrub oaks tend to be scarce or absent.

Mesic Pine Flatwoods. This community is present mainly in the Sandhills region and generally occurs as small-acreage sites embedded in the above two communities. Topographically, it tends to occur on broad flats or swales. It grades into Pine/Scrub Oak Sandhill on the drier end and Wet Pine Flatwoods on the wetter end. Longleaf pine is usually the canopy dominant. Fire-suppressed sites have dense zones of shrubs such as sweet pepperbush (*Clethra alnifolia*) and dangleberry (*Gaylussacia frondosa*). The community is characterized by a high forb diversity (at least where frequently burned), especially by legumes, and they are colloquially called “pea swales”. A number of rare species can be found in this community, and several good examples are present in the Sandhills Game Land.

Dry Oak-Hickory Forest. This community is widespread in the Piedmont, but in the Coastal Plain counties it is quite scarce. Most, if not all, of the county examples are of the Coastal Plain Sand variant, and they are not significant enough or large enough to specifically identify in the inventory. This community blends with the Pine/Scrub Oak Sandhill community, and in fact, many examples may simply be long fire-suppressed examples of Pine/Scrub Oak Sandhill. The Sand variant features “non-scrub” oaks such as southern red oak (*Quercus falcata*), post oak (*Q. stellata*), black oak (*Q. velutina*), among others, mixed with various hickory species (*Carya* spp.). A few longleaf pines and/or shortleaf pines (*P. echinata*) are frequently found in this community. Understory species include widespread trees such as sourwood (*Oxydendrum arboreum*), flowering dogwood (*Cornus florida*), and American holly (*Ilex opaca*); and the small tree sweetleaf (*Symplocos tinctoria*) may be very common. A good array of ericaceous shrubs may be present, but herb diversity is usually low.

Wetland Communities

Cypress Savanna. This is a rare community in North Carolina, being limited almost exclusively to clay-based Carolina bays. A few examples are present in Scotland County, with several variants represented, according to Schafale and Weakley (1990). Big Cypress Meadow (within Site 21) is the primary example in the county of the Cypress Savanna (Typic variant). In this variant, the canopy is usually dominated, often solely, by pond-cypress (*Taxodium ascendens*). Other woody plants may be sparse, but titi (*Cyrilla racemiflora*) may be common. The Cypress Savanna (Depression Meadow variant) normally contains no trees, and in many cases no shrubs either. Whether woody plants were ever present at such depressions is unclear; these sites may have been nearly permanent ponds at a former time. Examples of this variant in the county

include Laurinburg Pond (within Site 21), Good News Bay (Site 30), and Stateline Prairie Bay (Site 31). Within both variants, dense stands of graminoids dominate the herb layer, with species such as maidencane (*Panicum hemitomon*) being dominant in many bays. Rare herbs, such as awned meadow-beauty (*Rhexia aristosa*), are present in most such bays; and the state's only population of Canby's dropwort (*Oxypolis canbyi*) is present in this community at Big Cypress Meadow.

Coastal Plain Depression Swamp. This is a type of natural community that will appear in the Fourth Approximation of "The Natural Communities of North Carolina" (Schafale, in prep.). This community occurs mainly in Carolina bays and other depressions, where the vegetation is not obviously a Cypress Savanna (clay-based bay) or a pocosin community (peat-based bay). This community may well represent, at least in Scotland County, a long fire-suppressed Cypress Savanna, but it may be a valid type on its own. The county has a number of Carolina bays with this "new" community, where the dominant trees include red maple (*Acer rubrum*), tuliptree (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), and/or swamp tupelo (*Nyssa biflora*). Most have a "bay"/pocosin component, with redbay (*Persea palustris*) and other evergreens in the subcanopy and shrub layers. Atlantic white-cedar (*Chamaecyparis thyoides*) and loblolly pine (*Pinus taeda*) may be present in some bays.

Wet Pine Flatwoods. In some parts of the lower Coastal Plain, this community merges with Mesic Pine Flatwoods. However, in Scotland County, Wet Pine Flatwoods typically are found in broad flats at the base of sandhill slopes, adjacent to Streamhead Pocosins. Pine/Scrub Oak Sandhill normally lies upslope of Wet Pine Flatwoods. Longleaf pine, and at times pond pine (*P. serotina*), is the canopy dominant. Areas that are frequently burned have little understory. Typical species of the community are creeping blueberry (*Vaccinium crassifolium*), dwarf waxmyrtle (*Myrica cerifera* var. *pumila*), and pyxie-moss (*Pyxidanthera barbulata*). Dense stands of sweet pepperbush and dangleberry often occur along the wetter ecotone with Streamhead Pocosin. Herbaceous plants include several species of meadow-beauties (*Rhexia* spp.) and yellow-eyed-grasses (*Xyris* spp.).

Peatland Atlantic White Cedar Forest. This community is essentially limited in the state to the lower Coastal Plain, typically embedded in Pond Pine Woodland and/or Nonriverine Swamp Forest communities. In the wedge of Southern Inner Coastal Plain sediments that occur between the Lumber River/Drowning Creek and upland Sandhills in northeastern Scotland County, a few tiny areas within Pond Pine Woodlands appear to represent this community. The white-cedar generally is the dominant canopy tree, but other trees such as pond pine or red maple are usually present.

Streamhead Atlantic White Cedar Forest. This community occurs in narrow bands along streams, in the county mainly limited to the Sandhills region. However, because scattered Atlantic white-cedar frequently occurs in the county, generally within the Streamhead Pocosin community, the cutoff between the two communities can be difficult to determine. There are few places in Scotland County where the cedar dominates the canopy (and be considered as

Streamhead Atlantic White Cedar Forest); other canopy trees may include red maple, pond pine, swamp tupelo, among a few others. Where the cedars grow very dense, there is little else beneath them because of dense shade; however, most stands feature “pocosin” species such as shining fetterbush (*Lyonia lucida*), big gallberry (*Ilex coriacea*), and sweetbay magnolia (*Magnolia virginiana*).

Sandhill Seep. This community occupies very little space on the land surface, being typically no more than 10-30 feet wide and perhaps 200 feet in length. They occur on slopes where groundwater has hit an impervious clay layer and is shunted laterally to the surface. Seeps are fairly common in the Sandhills half of the county, but very rare in the Southern Inner Coastal Plain. Where frequently burned, a diverse wetland flora containing “savanna” species such as pitcher-plants (*Sarracenia* spp.) can be found; however, those that are fire-suppressed are choked with shrubs such as inkberry (*Ilex glabra*) and sweet pepperbush.

Streamhead Pocosin. This is one of the most common natural communities in the state, being the dominant wetland community along the smaller drains and streams in the Sandhills Region, but much less numerous in the Southern Inner Coastal Plain. The canopy is usually a mix of hardwoods such as swamp tupelo, red maple, and sweetgum, and two conifers – pond pine and Atlantic white-cedar. Broadleaf evergreens are prevalent, and nearly all Streamhead Pocosins contain some sweetbay magnolia and redbay in the subcanopy, and shining fetterbush, big gallberry, inkberry, and other woody species in the shrub layer. Bamboo-vine (*Smilax laurifolia*) typically drapes over the shrubs, making foot passage difficult. Deciduous species typical of the community are titi, sweet pepperbush, and dangleberry.

Pond Pine Woodland. Though a common community in the state’s Lower Coastal Plain, it is rare in Scotland County, being limited essentially to flatlands adjacent to the floodplain of the Lumber River, along the blend zone between Sandhills and Southern Inner Coastal Plain regions. The several extensive examples (Sites 14 and 15) in the county contain a dominance of pond pine in the canopy, typically mixed with loblolly pine and/or longleaf pine. Atlantic white-cedar can also be present. Various woody pocosin species, listed under “Streamhead Pocosin”, are present. This community tends to blend with Wet Pine Flatwoods along its inner margin and with various swamp communities closer to the river channel.

High Pocosin. This is a common natural community farther downstate, such as in peat-filled bays in the Bladen Lakes region and in larger pocosin areas near the coast. The community is probably absent, or very rare, in the Sandhills, but one or two small, borderline examples are present in Scotland County along the edge between Sandhills and Southern Inner Coastal Plain (Site 15). Typically there is no canopy, but instead tall shrubs or very small trees dominate – such as titi, big gallberry, shining fetterbush, obovate coastal juneberry (*Amelanchier obovalis*), and in wetter places honey-cups (*Zenobia pulverulenta*). Some depressions in the Sandhills Region that are dominated by pocosin shrubs are best treated as the next natural community.

Small Depression Pocosin. This community, along with High Pocosin, occupies tiny areas on the landscape, with most examples of this community being no more than 100 feet across. Within the Sandhills Region are a few natural sags in the topography that retain enough water to have woody vegetation. There may be a few trees, but typically species such as titi, big gallberry, and shining fetterbush dominate. In the wetter places, honey-cups, swamp doghobble (*Leucothoe racemosa*), and highbush blueberry (*Vaccinium fuscatum*) may occur in dense stands. Herbaceous species, as well as sphagnum moss, may be present in openings or along the margins.

Small Depression Pond. This is a very rare natural community in the Sandhills and Southern Inner Coastal Plain, being found primarily close to the coast in areas underlain by marl/limestone. Scotland County does have natural depressions that contain water for much or most of the year, but generally they are better treated as Vernal Pools or Cypress Savannas. These include Bog Hole (within Site A), Laurinburg Pond (within Site 21), and Good News Bay (Site 30). Small Depression Ponds retain water essentially all year, such as many limesink ponds and a very few Carolina bays; no limesink ponds, nor any permanent bay ponds, are known from Scotland County.

Vernal Pool. This is somewhat a catch-all natural community that encompasses topographic sags or depressions that contain water for parts of the year but typically are dry in much of the summer and fall. Most Vernal Pools in the county are slight depressions within the Sandhills region, such as small examples in Sites 6, 7, and 8. Bog Hole (within Site A) is a very large depression – the size of some Carolina bays – but as it normally dries completely for much of the year, it is better treated as a Vernal Pool, though it approaches a Small Depression Pond community. A Vernal Pool typically is herb-dominated; shrub-dominated sites are classified as Small Depression Pocosins. Wetland species such as various sedges and rushes, yellow-eyed-grasses, meadow-beauties, and bladderworts (*Utricularia* spp.) are typically found. These sites often contain rare species, such as water dawnflower (*Stylisma aquatica*).

Sand and Mud Bar. This natural community occurs along larger rivers, typically brownwater ones, in the Coastal Plain and to a lesser extent in the Piedmont. Scotland County is devoid of brownwater rivers, and blackwater rivers such as the Lumber typically do not carry much sediment. A few fair examples are present along the Lumber River. Typical species (herbs) include false-nettle (*Boehmeria cylindrica*), smartweeds (*Polygonum* spp.), whorled pennywort (*Hydrocotyle verticillata*), and several grasses. Such communities seldom are larger than 10-20 feet wide and long.

Cypress-Gum Swamp (Blackwater subtype). This is a common natural community in the Coastal Plain, though it is found mainly along larger rivers. Most stands of cypress and gum in Scotland County occur along smaller streams (Coastal Plain Small Stream Swamp) and at millponds or beaver ponds (Coastal Plain Semipermanent Impoundment). The Lumber River contains good and reasonably extensive examples of this community type. Bald-cypress (*Taxodium distichum*), pond-cypress, and/or swamp tupelo forms the bulk of the canopy, though bald-cypress appears to be rare in the Scotland County portion of the river. Few other species may be present, though

water ash (*Fraxinus caroliniana*) may be present in the understory layer; as with bald-cypress, it is much more common downstream in Robeson County. Shrubs may grow on buttresses of the trees, as this community typically is flooded for most of the year. Sarvis holly (*Ilex amelanchier*) is a rare shrub that occurs in this community.

Coastal Plain Bottomland Hardwoods (Blackwater subtype). This natural community is relatively uncommon, as compared with blackwater swamp forests, but examples do occur in the county along the Lumber River. The community occurs behind swamp forests on slightly higher ground that floods only infrequently, though is still considered a wetland. Laurel oak (*Quercus laurifolia*) may be quite common, along with loblolly pine, sweetgum, red maple, and other species. The understory is usually fairly well developed, with American holly joined by “pocosin” trees such as redbay and sweetbay magnolia. Cane (*Arundinaria gigantea*) is frequently a common shrub, and a variety of ferns are often typical.

Coastal Plain Levee Forest (Blackwater subtype). This is a rare and poorly-developed natural community in the state, and good examples are scarce. Whether any true levees occur in the county is not clear. Even so, they would closely approximate the species found in the Bottomland Hardwoods, except that the community would occur immediately along the Lumber River, and not behind a swamp forest away from the river channel. On the other hand, natural levees on brownwater rivers can be quite impressive, and stand several feet above other communities, as brownwater rivers deposit large amounts of sediment adjacent to the river banks.

Coastal Plain Small Stream Swamp (Blackwater subtype). This is likely the most common wetland community in Scotland County, occupying the most acreage. Nearly all creeks in the Southern Inner Coastal Plain, and some of the larger ones in the Sandhills, contain this community. Such sites contain a mix of species of swamps and bottomlands. Swamp tupelo, red maple, and/or sweetgum dominate these communities, but cypresses may be locally numerous. American hornbeam (*Carpinus caroliniana*) is usually common in the understory. Most sites in Scotland County have understories and shrub layers composed mainly of broadleaf evergreen species, such as redbay, sweetbay magnolia, bamboo-vine, big gallberry, and shining fetterbush. Some sites have an extensive cover of coastal doghobble (*Leucothoe axillaris*), a low shrub not found in many other Scotland communities.

Coastal Plain Semipermanent Impoundment. This community exists in both man-made and natural types. Essentially all former millponds contain this community, at least at the upper ends, and most beaver ponds feature the community, as well. The community is dominated by living trees that stand in water, often several feet deep. Pond-cypress, occasionally bald-cypress, and swamp tupelo dominate these ponds. Shrubs often are limited to growing on buttresses of these trees, at least where water is deep. Dense stands of water loosestrife (*Decodon verticillatus*) may be present. Floating vegetation, such as water-lily (*Nymphaea odorata*), is common. Beaver ponds typically are richer in plant diversity, with many graminoids and other herbs at the upper

ends of the ponds. Over time, these beaver ponds fill in with sediment and become more vegetated, eventually becoming other communities.

Significant Plant Species

Scotland County has quite a diverse flora – over 900 species of plants (B. Sorrie, pers. comm.) -- because it straddles the lie between the Sandhills region and the Southern Inner Coastal Plain region, both within the Atlantic Coastal Plain province. It is not quite as diverse as neighboring Richmond County, which contains a part of the Piedmont province and thus has more “inland” species, even without containing Southern Inner Coastal Plain sediments. Scotland has 55 plant species listed as “Rare” by the NC NHP as of March 2005 (see Table 3). Of these, four – rough-leaf loosestrife (*Lysimachia asperulifolia*), Canby’s dropwort (*Oxypolis canbyi*), Michaux’s sumac (*Rhus michauxii*), and chaffseed (*Schwalbea americana*) are Federally listed, as Endangered; there are no Federally Threatened plants known from the county. A number of populations of the sumac and loosestrife occur in the county, mainly in the Sandhills Game Land; the sumac is locally numerous at Camp Mackall. The chaffseed is known from just two sites, both in the Game Land, and one is historic. The other site was discovered in 1997; until that date, it was assumed that practically all remaining North Carolina populations were restricted to the Hoke and Cumberland portions of Fort Bragg, which has the very high fire frequency (at least once every three years) that this species seems to require. The state’s only known population of the dropwort, in Big Cypress Meadow within the McIntosh Bay Complex, was quite large a decade ago. A decline in the water table seems to have depleted the population, and sadly not a single plant could be found by several botanists, including the author, on trips to the bay in 2004. However, visits in upcoming years will be needed, as it is too early to write off the species as extirpated from the site, the county, and the state.

A total of 12 species in Scotland County are rare enough globally that they are considered by the U.S. Fish and Wildlife Service to be Federal Species of Concern. Those that are also State Endangered are the Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*), sandhills lily (*Lilium pyrophilum*), and Pickering’s dawnflower (*Stylisma pickeringii* var. *pickeringii*). The indigo-bush was discovered in Scotland County during this inventory, when a moderate population was found at the Chalk Banks section of Lumber River State Park. It is found mainly near streams in the Fort Bragg area, especially along the Little River. The lily, though found at a number of sites in the Sandhills region, is seldom found in numbers (of more than 10 individuals). On the other hand, the dawnflower is quite common in some spots along the sandy banks of roadcuts that pass through the Sandhills Game Land, but it does have a large population in a natural site at the Green Pond Bay Rim.

Federal Species of Concern that are State Threatened are the sandhills milk-vetch (*Astragalus michauxii*), bog spicebush (*Lindera subcoriacea*), Boykin’s lobelia (*Lobelia boykinii*), awned meadow-beauty (*Rhexia aristosa*), and spring-flowering goldenrod (*Solidago verna*). The milk-vetch is very widespread in sandhills in the county, though usually only a few plants are seen at a

Table 3. Rare Plant Species Known from Scotland County. An explanation of the rank and status codes appears at the end of the table. All rare (E, T, or SR) species are listed, whether currently believed extant in the county or not. Species on the Watch List are included in the site descriptions but are not included on this table.

Element	Global Rank	State Rank	US Status	State Status	Significant Sites
Agalinis virgata branched gerardia	G3G4Q	S2	-	SR	I, 31
Amorpha georgiana var. georgiana Georgia indigo-bush	G3T2	S2	FSC	E	15
Amphicarpum muehlenbergianum Florida goober grass	G4	S1	-	SR	21
Astragalus michauxii sandhills milk-vetch	G3	S3	FSC	T	I, II, 1, 2, 4, 5, 7, 8
Campylopus carolinae savanna campylopus	G1G2	S1	FSC	SR	I
Carex canescens ssp. disjuncta silvery sedge	G5T4?	S1	-	SR	I, 18
Danthonia epilis bog oatgrass	G3?	S2?	FSC	SR	I, II, 1, 7
Eleocharis atropurpurea purple spikerush	G4G5	SH	-	SR	not in an identified site
Eleocharis robbinsii Robbins's spikerush	G4G5	S2	-	SR	I, II, 7
Eupatorium leptophyllum limesink dog-fennel	G4G5	S1	-	SR	30, 31
Eupatorium resinosum resinous boneset	G3	S3	-	T-SC	I, II, 2
Gaillardia aestivalis sandhills gaillardia	G5	S1	-	SR	I, II, 5, 7
Galactia mollis soft milk-pea	G4G5	S2	-	SR	I, II, 7, 8
Gnaphalium helleri var. helleri Heller's rabbit-tobacco	G4G5T3?	S2?	-	SR	I
Gratiola ramosa branched hedge-hyssop	G4G5	S1	-	SR	30
Ilex amelanchier sarvis holly	G4	S3	-	SR	I, II, 13, 14, 16

Table 3. (Continued)

Element	Global Rank	State Rank	US Status	State Status	Significant Sites
<i>Iva microcephala</i> small-headed marsh elder	G5	S1	-	SR	21, 29, 31
<i>Kalmia cuneata</i> white wicky	G3	S3	-	SR	I, II, 1, 5, 10, 11, 15, 25
<i>Liatris squarrulosa</i> Earle's blazing-star	G4G5	S2	-	SR	I, 3
<i>Lilium pyrophilum</i> sandhills lily	G2	S2	FSC	E-SC	I, II
<i>Lindera subcoriacea</i> bog spicebush	G2	S2	FSC	T	I, II
<i>Lobelia boykinii</i> Boykin's lobelia	G2G3	S1	FSC	T	21, 31
<i>Ludwigia suffruticosa</i> shrubby seedbox	G5	S2	-	SR	I, 21, 30, 31
<i>Luziola fluitans</i> southern water grass	G4G5	S1S2	-	SR	I
<i>Lysimachia asperulifolia</i> rough-leaf loosestrife	G3	S3	E	E	I, II
<i>Oldenlandia boscii</i> Bosc's bluet	G5	S1	-	SR	30
<i>Oxypolis canbyi</i> Canby's dropwort	G2	S1	E	E	21
<i>Panicum tenerum</i> southeastern panic grass	G4	S3	-	SR	21, 31
<i>Parnassia caroliniana</i> Carolina grass-of-Parnassus	G3	S2	-	E	II
<i>Paronychia herniarioides</i> Michaux's whitlow-wort	G3G4	S1	-	SR	26
<i>Paspalum dissectum</i> mudbank crown grass	G4?	S1	-	SR	I, 21
<i>Polygala grandiflora</i> showy milkwort	G5?	S2	-	SR	I, II, 5, 7
<i>Polygonum hirsutum</i> hairy smartweed	G4G5	S1	-	SR	not in an identified site
<i>Potamogeton confervoides</i> Conferva pondweed	G4	S2	FSC	SR	I, 25

Table 3. (Continued)

Element	Global Rank	State Rank	US Status	State Status	Significant Sites
<i>Rhexia aristosa</i> awned meadow-beauty	G3	S3	FSC	T	21, 29, 30, 31
<i>Rhus michauxii</i> Michaux's sumac	G2	S2	E	E-SC	I, II, 5, 9
<i>Rhynchospora macra</i> southern white beaksedge	G3	S1	-	E	I, 7
<i>Rhynchospora tracyi</i> Tracy's beaksedge	G4	S2	-	SR	21
<i>Ruellia ciliosa</i> sandhills wild-petunia	G3G4Q	S1	-	SR	I, 7
<i>Sagittaria isoetiformis</i> quillwort arrowhead	G4?	S1	-	SR	21
<i>Salvia azurea</i> azure sage	G4G5	S1	-	SR	(X?) not in an identified site
<i>Schoenoplectus etuberculatus</i> Canby's bulrush	G3G4	S3	-	SR	I, II, 7, 25
<i>Schoenoplectus subterminalis</i> swaying bulrush	G4G5	S3	-	SR	I, II, 19
<i>Schwalbea americana</i> chaffseed	G2	S1	E	E	I, 7
<i>Scleria georgiana</i> Georgia nutrush	G4	S2	-	SR	31
<i>Scleria reticularis</i> netted nutrush	G4	S2	-	SR	21, 31
<i>Solidago leavenworthii</i> Leavenworth's goldenrod	G3G4	S1	-	SR	31
<i>Solidago tortifolia</i> twisted-leaf goldenrod	G4G5	S1	-	SR	(X?) 5
<i>Solidago verna</i> spring-flowering goldenrod	G3	S3	FSC	T	I, 25
<i>Stylisma aquatica</i> water dawnflower	G4	S1	-	SR	I, 8, 31
<i>Stylisma pickeringii</i> var. pickeringii Pickering's dawnflower	G4T3	S3	FSC	E	I, II, 26
<i>Tridens ambiguus</i> pineland triodia	G4	S1	-	SR	31

Table 3. (Continued)

Element	Global Rank	State Rank	US Status	State Status	Significant Sites
Tridens carolinianus Carolina triodia	G3	S3	-	SR	I, 5, 8
Xyris chapmanii Chapman's yellow-eyed-grass	G3	S2	-	SR	I, II
Xyris scabrifolia roughleaf yellow-eyed-grass	G3	S2	FSC	SR	I

X?

Species may be extirpated from the county; no records in over 20 years, but suitable habitat remains, and the species might be re-discovered. Species is extant in a neighboring county.

EXPLANATION OF RANK AND STATUS CODES

Global Rank:

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals) or because of some factor(s) making it especially vulnerable to extinction.

G2 = Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single physiographic region) or because of other factors making it vulnerable to extinction throughout its range; in the range of 21 to 100 occurrences.

G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

GU = Status uncertain; need more information to rank.

T_ = The rank of a subspecies or variety. As an example, G4T1 would apply to a subspecies of a species with an overall rank of G4, but the subspecies warranting a rank of G1.

G_Q = Questionable taxonomic assignment.

State Rank:

- S1 = Critically imperiled in North Carolina because of extreme rarity (5 or fewer occurrences or very few remaining individuals) or because of some factor(s) making it especially vulnerable to extirpation from North Carolina.
- S2 = Imperiled in North Carolina because of rarity (6 to 20 occurrences or few remaining individuals) or because of some factor(s) making it very vulnerable to extirpation from North Carolina.
- S3 = Rare or uncommon in North Carolina (on the order of 21 to 100 occurrences).
- SH = Of historic occurrence in North Carolina, not having been reported in the past 20 years, but suspected to still be extant.
- S_B = Rank of the breeding population in the state. Used for migratory species only.
- S_N = Rank of the non-breeding population in the state. Used for migratory species only.

US Status:

- E = Endangered. A taxon "which is in danger of extinction throughout all or a significant portion of its range..." (Endangered Species Act, page 3).
- T = Threatened. A taxon "which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." (Endangered Species Act, page 4).
- T (S/A) = Threatened due to Similarity of Appearance. (The American Alligator is considered similar in appearance to the American Crocodile.)
- FSC = Federal Species of Concern. This status replaces the former "Category 2" Candidate status. FSC taxa have no official status, but are taxa that are of concern to the U.S. Fish and Wildlife Service and may require listing at a future time.

State Status:

- E = Endangered
- T = Threatened
- SC = Special Concern
- SR = Significantly Rare

The E, T, and SC plant statuses are determined by the Plant Conservation Program, N.C. Department of Agriculture and Consumer Services. The E, T, and SC animal statuses are determined by the N.C. Wildlife Resources Commission. Taxa in these statuses of plants and animals are afforded some protection by state law. The N.C. Natural Heritage Program designates the SR status; however, taxa in this status are not afforded protection by state law. The Program tracks SR taxa (as well as taxa with E, T, and SC statuses) and keeps manual files of taxa on its Watch List.

given site. The spicebush is found at a handful of sites in the Sandhills Game Land and Camp Mackall, but no sites are known in the county away from those managed areas. The lobelia and the meadow-beauty are primarily “bay/depression” species, and in Scotland County are restricted to clay-based Carolina bays, with the meadow-beauty being more widespread in the county – one new population was found during the inventory – and in the state’s Coastal Plain than the lobelia. The goldenrod is found in a few places in the Sandhills Game Land, and a moderately large population was found during the inventory along road margins at the Richmond Mill Natural Area.

Several plants are state listed as Endangered, but are not on the Federal list. The Carolina grass-of-Parnassus (*Parnassia caroliniana*) is found primarily in the state in marl-dominated savannas and flatwoods ecotones. Surprisingly, there is a sandhills record from Camp Mackall. The southern white beaksedge (*Rhynchospora macra*) has been found at just a single site in the county, along a pond margin in the Game Land. The only State Threatened plant, not already on a Federal list, is the resinous boneset (*Eupatorium resinosum*). It is found at the margins of several ponds, mainly in the Camp Mackall area.

Another plant merits special mention in this report. This inventory yielded the first documented record in North Carolina for the Michaux’s whitlow-wort (*Paronychia herniarioides*), a mat-like herb found on the xeric sands at the Green Pond Bay Rim. There was a vague reference to the plant being found by Andre Michaux several hundred years ago between Fayetteville, North Carolina, and Florence, South Carolina, but, without modern-day maps and roads, it isn’t clear in which state he noted the species. This species is apparently quite rare also in South Carolina, which was the former northern end of the range.

The habitats of the various rare plants fall into several distinct groups. Probably the most limited are those found in clay-based Carolina bays, as these species seem to be lacking in other wetlands, such as margins of lakes and ponds or pocosin ecotones. Rare species in the county essentially restricted to clay-based bays are: Florida goober grass (*Amphicarpum muehlenbergianum*), limesink dog-fennel (*Eupatorium leptophyllum*), branched hedge-hyssop (*Gratiola ramosa*), small-headed marsh elder (*Iva microcephala*), Boykin’s lobelia, shrubby seedbox (*Ludwigia suffruticosa*), Bosc’s bluet (*Oldenlandia boscii*), Canby’s dropwort, southeastern panic grass (*Panicum tenerum*), mudbank crown grass (*Paspalum dissectum*), awned meadow-beauty, Tracy’s beaksedge (*Rhynchospora tracyi*), quillwort arrowhead (*Sagittaria isoetiformis*), Georgia nutrush (*Scleria georgiana*), netted nutrush (*Scleria reticularis*), Leavenworth’s goldenrod (*Solidago leavenworthii*), and pineland triodia (*Tridens ambiguus*).

The majority of the rare plants occur in the Sandhills region of the county, and thus are limited mainly to the northwestern one-third of the county. Some are typical of xeric uplands, such as Pickering’s daffodil; however, a good number favor loamy soil in swales and other flats. Some of these “loamy-soil” species include soft milk-pea (*Galactia mollis*), showy milkwort (*Polygala grandiflora*), Michaux’s sumac, sandhills wild-petunia (*Ruellia ciliosa*), and

chaffseed. Many rare sandhills herbs are found along Sandhill Seeps or along streamhead pocosin ecotones with uplands, such as in Wet Pine Flatwoods; examples include sandhills lily, rough-leaf loosestrife, spring-flowering goldenrod, and the two yellow-eyed-grasses. Rare shrubs of the streamhead pocosins themselves are the bog spicebush and the white wicky (*Kalmia cuneata*). Some rare plants prefer the marshy/boggy margins of beaver ponds or man-made reservoirs, perhaps needing more sunlight than other wetland plants; rare “pond-margin” plants include resinous boneset and Conferva pondweed (*Potamogeton confervoides*). On the other hand, the two rare bulrushes prefer growing in blackwater creeks and their margins.

Surprising is the general lack of rare plants that grow in the county’s many floodplains, such as those of the Lumber River, Shoe Heel Creek, Juniper Creek, and Jordan Creek. In North Carolina, there simply are very few plants that are so localized to blackwater streams and floodplains that they are considered rare (except in the unusual Waccamaw River system). The only rare plant in the county typically found in floodplains is the sarvis holly (*Ilex amelanchier*), and this shrub also grows in some Carolina bays (though not known in such bays in the county). Fortunately, the population of the holly is scattered all along Drowning Creek and the Lumber River, the length of the county, and the Lumber floodplain is considered the state’s best population for this shrub, which can easily be seen along the banks of the river while one is canoeing.

Only a few rare plants known to have occurred in the county have not been re-located in recent years. In fact, until a decade ago, these two species – azure sage (*Salvia azurea*) and twisted-leaf goldenrod (*Solidago tortifolia*) – had gone unreported in the entire state for a few decades. Fortunately, both were re-discovered in the past few years during other inventories – the sage in the Richmond County inventory and the goldenrod in the Hoke County inventory. As these are neighboring counties, and as the habitats for them – somewhat loamy flats and swales – are relatively widespread in the county, there is hope that they still may be present in Scotland County. In fact, because the county lies along the South Carolina state line, it is to be expected that new plants (in addition to the whitlow-wort) for North Carolina will be discovered by botanists, most likely working on their own time on weekend visits.

Significant Animal Species

As with the plants, Scotland County contains a large animal fauna, including more rare species than one would expect for a “small” county. The county has 34 rare animals tracked by NC NHP, as of March 2005 (see Table 4). However, there must be many other rare species, as NC NHP has no records entered for any rare moths, dragonflies, and some other groups of invertebrates. Only one animal species, the red-cockaded woodpecker (*Picoides borealis*), is Federally Endangered; dozens of pairs of woodpecker nest in the Sandhills portion of the county, nearly all on the Sandhills Game Land and Camp Mackall. The only other Federally listed species is the American alligator (*Alligator mississippiensis*); it is listed only as Threatened due to Similarity of Appearance in order to protect the American crocodile (*Crocodylus acutus*). In

Table 4. Rare Animal Species Known from Scotland County. All rare (E, T, SC, or SR) species are listed, whether currently believed extant in the county or not. See Table 3 for an explanation of the rank and status codes. Species on the Watch List are included in the site descriptions but are not included on this table.

Element	Global Rank	State Rank	US Status	State Status	Significant Sites
<u>MAMMALS</u>					
Condylura cristata pop. 1 star-nosed mole – Coastal Plain population	G5T2Q	S2	-	SC	not in an identified site
<u>BIRDS</u>					
Aimophila aestivalis Bachman's sparrow	G3	S3B, S2N	FSC	SC	I, II, 2, 3, 4, 5, 7, 8
Chondestes grammacus lark sparrow	G5	S1B, SZN	-	SR	II, 2
Ictinia mississippiensis Mississippi kite	G5	S2B	-	SR	not in an identified site
Lanius ludovicianus loggerhead shrike	G4	S3B,S3N	-	SC	I, II, many other non- identified sites
Picoides borealis red-cockaded woodpecker	G3	S2	E	E	I, II, 1, 2, 5, 7, 8, 9, 10, 14, 25
<u>REPTILES</u>					
Alligator mississippiensis American alligator	G5	S3	T (S/A)	T	(X); probable release, not known to be within range
Crotalus horridus timber rattlesnake	G4	S3	-	SC	I
Deirochelys reticularia chicken turtle	G5	S3	-	SR	I, 12, 21
Heterodon simus southern hognose snake	G2	S2	FSC	SC	I, 2, 8, 10
Masticophis flagellum coachwhip	G5	S3	-	SR	I, 1, 6
Micrurus fulvius eastern coral snake	G5	S1	-	E	(X) not in an identified site

Table 4. (Continued)

Element	Global Rank	State Rank	US Status	State Status	Significant Sites
Pituophis melanoleucus melanoleucus northern pine snake	G4T4	S3	FSC	SC	I, 2, 6
Sistrurus miliarius pigmy rattlesnake	G5	S3	-	SC	I, II
<u>AMPHIBIANS</u>					
Ambystoma mabeei Mabee's salamander	G4	S3	-	SR	I, 12, 21, 23
Ambystoma tigrinum eastern tiger salamander	G5	S2	-	T	I, 12, 21, 31
Bufo quercicus oak toad	G5	S3	-	SR	I, 12
Eurycea quadridigitata pop. 1 dwarf salamander - silver morph	G5T2Q	S2	-	SC	21, 31
Hyla andersonii pine barrens treefrog	G4	S3	-	SR	I, II, 2, 14
Pseudacris ornata ornate chorus frog	G5	S3	-	SR	I, 12, 21, 31
Rana capito Carolina gopher frog	G3	S2	FSC	T	I, 2, 12, 21
Rana heckscheri river frog	G5	SH	-	SC	(X?) 16
<u>FISHES</u>					
Cyprinella sp. 1 thinlip chub	GUQ	S2	-	SC	17
Etheostoma mariae pinewoods darter	G3	S3	FSC	SC	I, 2, 5, 7, 10, 18, 19, 23
Semotilus lumbee sandhills chub	G3	S3	FSC	SC	I, 2, 10, 18
<u>CRUSTACEANS</u>					
Procambarus braswelli Waccamaw crayfish	G2G3	S2S3	-	SC	not in an identified site

Table 4. (Continued)

Element	Global Rank	State Rank	US Status	State Status	Significant Sites
<u>INSECTS – BUTTERFLIES</u>					
Amblyscirtes alternata dusky roadside-skipper	G3G4	S2	-	SR	I, II, 6
Amblyscirtes reversa reversed roadside-skipper	G3G4	S3	-	SR	I
Callophrys hesseli Hessel's hairstreak	G3G4	S3	-	SR	I, 5, 18
Callophrys irus frosted elfin	G3	S2	-	SR	I, 8, 10
Hesperia attalus dotted skipper	G3G4	S2S3	-	SR	I, II, 1, 5
Hesperia meskei Meske's skipper	G2G4	S3	-	SR	I, II, 1, 5, 8
Satyrrium edwardsii Edwards' hairstreak	G4	S2?	-	SR	II
Satyrrium kingi King's hairstreak	G3G4	S2S3	-	SR	15, 21, 29

X

Species believed to be extirpated from the county, no matter the date of last occurrence.
(Generally, a well-surveyed or conspicuous species.)

X?

Species may be extirpated from the county; no records in recent years, but suitable habitat remains, and the species might be re-discovered.

addition, the one record of the alligator known to NC NHP for the county, in the Sandhills, was a likely release in a pond. The species has been recorded in Maxton Pond, close to the county in nearby Robeson County, but even in Robeson County one wonders if many or most records in lakes and ponds relate to releases.

Six species are listed as Federal Species of Concern by the U.S. Fish and Wildlife Service. Most of these six rare animals are located in the Sandhills region in the northwestern portion of the county, but a few are present elsewhere. Of these, none is listed as State Endangered, and only one is listed as State Threatened – the Carolina gopher frog (*Rana capito*). This frog has been found at a handful of sites in the county, both in the Sandhills Game Land and in the Southern Inner Coastal Plain. It inhabits natural pools and ponds, as well as borrow pit ponds. The remaining five species are State Special Concern. The Bachman's sparrow (*Aimophila aestivalis*) is essentially limited now, as is the woodpecker, to high-quality longleaf pine sandhills, in the Sandhills region of the county. There are many pairs present, but as with the woodpecker, its numbers are likely declining, as it needs high fire frequencies to maintain thick grassy cover. The southern hognose snake (*Heterodon simus*) is widespread in the Sandhills region, occurring in dry, sandy soils. However, many records are of road-killed specimens, and it is difficult to find alive (being mostly nocturnal). It is believed to be declining sharply in its overall range (Tuberville et al. 2000), but trends in North Carolina are uncertain. The northern pine snake (*Pituophis melanoleucus melanoleucus*) inhabits similar sites as the northern hognose snake, though it is often diurnal and is thus seen (alive) more frequently during field work. The two remaining species in this group are the pinewoods darter (*Etheostoma mariae*) and the sandhills chub (*Semotilus lumbee*). These small fishes are found in many streams in the county, and are not limited to just the Sandhills part of Scotland County. However, both have small ranges and are limited mainly to the "Greater Sandhills" area of south-central North Carolina and adjacent South Carolina.

One species – the eastern coral snake (*Micrurus fulvius*) – is State Endangered without a Federal status. However, it has not been recorded in the county in recent years (since 1957), and except for a few recent records in southern coastal counties, is likely to be extirpated now from inland counties in North Carolina. The only State Threatened animal (and not on the Federal lists) is the eastern tiger salamander (*Ambystoma tigrinum*). As with the Carolina gopher frog, it has been found at a handful of pools and ponds in the county, both in the Sandhills region and in the Southern Inner Coastal Plain. These two animals utilize natural clay-based Carolina bays in Scotland, Robeson, and Hoke counties for breeding, as well as depression ponds in the Game Land.

Interestingly, only one mammal is listed as rare for the county. The star-nosed mole (*Condylura cristata*) has been found only at one site in Scotland County. Even though the record is from 1975, this mammal is extremely secretive, spending most time in burrows below the ground surface, and thus is likely still found in the county. The NC NHP until 2004 tracked the eastern fox squirrel (*Sciurus niger*) as a rare species, but downgraded its status to Watch List, as numbers

seem to be faring well in many areas. The squirrel is fairly numerous in the Sandhills part of the county.

Five rare bird species occur in the county; of the three not mentioned above, the State Special Concern loggerhead shrike (*Lanius ludovicianus*) is fairly numerous in large fields and pastures, though it has declined as its farmland habitat shrinks. The Mississippi kite (*Ictinia mississippiensis*) has nested in downtown Laurinburg, though the species could not be found on the 2004 surveys. It feeds on cicadas and dragonflies high over swamps and bottomlands. The lark sparrow (*Chondestes grammacus*) breeds mainly in the central and western United States and a few pairs breed in the sandhills in very open sandy barrens, generally in military drop zones.

Six of the eight rare reptiles are snakes, most of which inhabit sandy or loamy soil of longleaf pine forests, though the timber rattlesnake (*Crotalus horridus*), very rare in the county, inhabits wetland forests. The chicken turtle (*Deirochelys reticularia*) occurs in small pools and ponds, generally ones with no drainage. There are also eight rare amphibians in the county. All but the pine barrens treefrog (*Hyla andersonii*) and river frog (*Rana heckscheri*) are essentially limited to breeding at clay-based Carolina bays and other small temporary ponds, where there are no fish. The pine barrens treefrog occurs in many places along pocosin ecotones, even where influenced by man (e.g., powerline cuts through pocosins), whereas the river frog formerly occurred in the state in pools and ponds very close to the Lumber River. The only rare fish not mentioned above is the thinlip chub (*Cyprinella* sp.), which has undergone much taxonomic debate. It was originally considered as an undescribed species, then was included as part of the Santee chub (*C. zanema*) taxon that occurs generally in the Piedmont province, but recent evidence indicates that it may well be a valid species, still undescribed. It occurs in the Lumber River, but most of its small range lies well to the east of the county.

No rare mollusks are known from the county; perhaps the waters are too acidic for much calcium to be present to be used in shell formation. The one rare crustacean – the Waccamaw crayfish (*Procambarus braswelli*) – is State Special Concern. It is known from two streams in the county; otherwise, this recently described species is limited to a small area of Lumber-Waccamaw drainage in southern North Carolina and adjacent South Carolina.

Eight rare butterflies are known from the county; as State regulations do not cover invertebrates other than mollusks and crustaceans, they are simply tracked by NC NHP as Significantly Rare. All are found primarily in the Sandhills region; several favor dry and open sandhills, whereas others favor ecotones near their hostplants. This inventory turned up the first Scotland County records for the Hessel's hairstreak (*Callophrys hesseli*), which uses Atlantic white-cedar (*Chamaecyparis thyoides*) as its sole foodplant (for the larvae). The inventory also found perhaps the largest population anywhere of the dotted skipper (*Hesperia attalus*), and one of the best for Meske's skipper (*H. meskei*), both of which favor open sandhills with an abundance of bluestem grasses (the foodplants).

Geographically, the great majority of the rare animals are found in, and essentially limited to, the Sandhills section (i.e., the northwestern third) of the county. These can be divided into the upland group, favoring dry and typically open sandhills, and the wetland group that favors pocosin ecotones and other wetlands. However, the scattered clay-based Carolina bays located in the remaining two-thirds of the county – the Southern Inner Coastal Plain region – are very important to most of the rare amphibians, which must lay eggs in fish-free environments. The various creeks in the county are home to two of the three rare fishes and the rare crayfish. Thus, all parts of Scotland County feature locations of rare animals.

DISCUSSION

Lands in Conservation Ownership

Table 1 lists the approximate percentage of conservation ownership (as calculated from GIS mapping) of the 31 standard sites, the two large managed areas, and the four clusters of sites described in the inventory. Fortunately, from the conservation perspective, Scotland County contains a considerable acreage in public conservation lands. The county's portion of the Sandhills Game Land, protected by the N.C. Wildlife Resources Commission (hereafter, NCWRC), comprises 22,546 acres, or 11% of all of the land in Scotland County. And, the 4,492 acres of U.S. Department of Defense's Camp Mackall in the county, though not all of which contains natural vegetation, comprises 2.2% of the county's acres. Thus, these two managed areas comprise 13.2% of the total land area of the county. The U.S. Fish and Wildlife Service holds small acreages of conservation easements at sites along Juniper Creek and Johns Pond/Leith Creek.

Much of the Lumber River has been designated a National Wild and Scenic River and also a State Natural and Scenic River. These designations cover the river from SR 1412 (Turnpike Road) down to the Robeson County line, a total of 22 river miles, as well as much additional river mileage farther downstream. These designations serve to protect the river's flow by precluding the construction of dams and reservoirs; however, the designations do not affect water quality matters such as discharges into the river.

Away from the Sandhills Game Land and Camp Mackall in the north, there is little conservation land in Scotland County. The N.C. Division of Parks and Recreation owns 555 acres along the Lumber River north of Wagram as the Chalk Banks section of Lumber River State Park; it also owns a small tract along the river north of the Laurinburg-Maxton Airport as part of that state park. The N.C. Department of Transportation owns roughly 4.5 acres of mitigation land at the Wagram Borrow Pit Amphibian Site. (Certain other areas of public land, such as the relatively large Laurinburg-Maxton Airport Authority land in the southeastern part of the county, are not included as conservation land by the NC NHP.)

Private conservation lands appear to be limited primarily to holdings of The Nature Conservancy (hereafter, TNC) and the N.C. Herpetological Society. TNC owns 235 acres at the McIntosh Bay Complex, which is 47% of the total acreage of the natural area, and also 10 acres (on the North Carolina side) at Stateline Prairie Bay (plus an additional 50 acres of the bay in South Carolina). The N.C. Herpetological Society owns 139 acres near the borrow pit as their Big Shoe Heel Creek Preserve.

Priorities for Protection

"Protection" means different things to different persons or agencies. "Protection" implies some form of conservation at a site, such that development and large-scale timber harvest are precluded in the foreseeable future. Sites in public ownership do not necessarily imply a protected status; a landfill or an airport owned by the county should not be considered as protected land. Likewise, flowing waters such as rivers and creeks are public waters "owned by the State of North Carolina", but they should not be considered as "protected" unless specific conservation measures, such as designation as an Outstanding Resource Water or a High Quality Water, have been enacted.

Normally, protection priorities in a county should start from the top down; thus, protection efforts should begin with Nationally significant sites, then State, then Regional, and then County sites. Nearly all of the Nationally significant sites are already in protected ownership, at the Sandhills Game Land and at Camp Mackall. However, only a portion of the Nationally significant McIntosh Bay Complex is protected, by TNC. The northeastern bay – Laurinburg Pond – has some protection as a Registered Natural Heritage Area, an agreement (to protect the natural area) between the landowner and the Department of Environment and Natural Resources. However, this is not a permanent protection, and TNC owns just the extreme southeastern tip of this bay. TNC owns only the southeastern 45% of Big Cypress Meadow just south of Laurinburg Pond, most of 401 Bay east of US 401, and nearly all of the small Backside Bay. Of course, TNC has made efforts to acquire all tracts encompassing these four bays, but for various reasons only roughly 45-50% of all four bays collectively are protected. Because a private landowner could timber his portion of a bay, or could dig a drainage ditch across a bay rim and alter the water level in a bay, it is very important that these (and other) clay-based Carolina bays be held in conservation ownership. This ownership should not only include the wetlands within the bay but should extend onto surrounding uplands, as the amphibians that breed in the bay do not reside there all year. The bays are frequently dry in the warmer months, and some of the animals spend most of the year roosting and foraging in these uplands.

Whereas permanent protection of the remainder of the McIntosh Bay Complex may reside with TNC and not with other conservation entities, nearly all other sites needing protection are potentially available to a number of public and private agencies. Perhaps the most significant, completely unprotected site in the county is the State significant Green Pond Bay Rim. Most of the rim, and the associated Carolina bay (considered to be within a secondary boundary), lies in a single ownership. This site contains several rare plant populations, one of which is found nowhere else in the state, and the Sand Barren community there is one of the best examples in the state, as well.

The other State significant site essentially in unprotected status is the Upper Lumber River Swamp. However, as this area lies within the acquisition boundary of the Lumber River State Park, most efforts toward protecting these wetlands will reside with the N.C. Division of Parks and Recreation. However, this acquisition boundary extends to the South Carolina state line, and

certainly there is no intent for that Division to acquire all floodplain lands along the river in Scotland County.

Despite the Upper Lumber River Swamp being of higher significance than several Regionally significant sites, the author considers several of the latter group of sites to take protection precedence over the Lumber River swamp. Because these latter sites are more easily timbered than riverine swamps, there is more of an urgency to protect them. The Lumber River/Chalk Banks Flatwoods and Pocosins is foremost among this group. This is a large area on the upper terrace of the Lumber River that is a “finger” of the Southern Inner Coastal Plain into the Sandhills region. Though a small percentage at the southern end is protected within the Chalk Banks section of Lumber River State Park, most is unprotected and under threat of logging, and then conversion to pine plantations, sand pits, or other destructive activities. This site contains extensive flatwoods and pocosins seldom found outside of the lower Coastal Plain and which are not found on the opposite (Hoke County) side of the Lumber River. Farther upstream is the unprotected (at least the Scotland County portion) Drowning Creek/Quewhiffle Creek Floodplain. It lies adjacent to the NCWRC Sandhills Game Land and just downstream of Camp Mackall. Despite its wetness, a large acreage of this floodplain was clearcut a few years ago on the Hoke County side immediately east of US 15-501 and is an eyesore from that highway, not to mention the loss of natural features of the site.

There are several Regionally significant Carolina bays needing protection. As few such clay-based bays in the state are protected, it is important to concentrate efforts on them, because most contain rare plant species and many contain rare animals as well. Good News Bay and Scotch Meadows Bay Complex are in this group; the latter site has a notable, open bay just south of US 15-401, plus a much larger forested bay to the south. The Riverton Road Bay Rim contains a Sand Barren community on the rim, and though the interior of the bay has been logged on many occasions, there may be rare plants in the bay itself. It is important that all efforts at protection of clay-based Carolina bays in the state not fall on the shoulders of TNC, as it has been to the present time. There are a number of public agencies, as well as one or two other non-profit organizations, whose mandate likely includes the protection of small sites such as Carolina bays.

A very large Regional site is the Richmond Mill Natural Area, in a single ownership. As the owner is a corporation, with its own land manager and other staff that work on that and other properties, protection is best achieved through a conservation easement or other such easements or legal agreements.

Probably most of the current protection efforts in Scotland County are focused on sandhills habitats, adjacent to the Sandhills Game Land. Such efforts are definitely warranted, even though large areas are already protected, because there are dozens of rare species and many significant natural communities found in this region. NCWRC is actively acquiring additional lands to add to the Game Land, with the help of TNC and the U.S. Fish and Wildlife Service. Though no privately-owned sandhills sites in the county are considered as National or State significant (as the Game Land and Camp Mackall already protect much sandhill habitat), there

are important Regional sites needing protection. The Highland Road Sandhills, lying adjacent to the south edge of the Game Land, is owned by a single corporation, with a site manager who conducts periodic prescribed burns on portions of the tract; thus, protection efforts should be directed toward easements and legal agreements, unless the owner decides to sell the property. The extensive private lands lying along US 15-501, mainly on the west side of the highway, are called here the Aberdeen Road Sandhills. The site has one main owner, but there are a number of additional owners. Protection of these lands would connect the Game Land across US 15-501, as currently there is a gap of ½-mile to a mile between Block B on the west and Block D on the east of the highway. Another Regional sandhills site needing protection lies east of Block D and adjacent to unprotected lands on the Lumber River; it is here called the Naomi Church Sandhills, with a few notable wetland depressions, and a large population of the Federally listed Michaux's sumac (*Rhus michauxii*).

The other main conservation focus in the county should be on floodplains other than the Lumber River/Drowning Creek. Though not as high a protection priority as that of the Lumber River, sandhills, or Carolina bays, these smaller floodplains often contain sizable stands of Atlantic white-cedar (*Chamaecyparis thyoides*) and are habitat for several rare fishes and a few plants and animals. Of most significance is probably the Juniper Creek floodplain (hereby called Juniper Creek Cedar Swamps), of Regional significance.

Many additional sites are worthy of protection. Some of these may best be protected through either the Registry of Natural Heritage Areas, or through a conservation or management easement, as funding is best utilized for the most important sites (i.e., of National, State, or Regional significance). Easements are good means for private landowners to reduce taxes while protecting their lands. See the section below for more information.

Landowner Protection Options

A number of privately-owned sites are mentioned in the section above. Though most public and private conservation entities would prefer to acquire tracts in fee simple, in order to have complete control over management of the tracts, in some cases the landowners do not wish to sell the tracts but are interested in other forms of protection of their land. Several protection/conservation options are available.

If the site contains a significant natural area as identified by the NC NHP, one protection option is the N.C. Registry of Natural Heritage Areas. This voluntary, non-binding agreement with the State can provide the landowner with management recommendations or prescriptions (if desired), some degree of statutory protection of the land from construction of pipelines and transmission lines, and public recognition (if desired). For more information, contact the N.C. Natural Heritage Program, Office of Conservation and Community Affairs, 1601 MSC, Raleigh, NC 27699-1601 (website: www.ncnhp.org).

A permanent protection option, which is fixed to the property deed, is the conservation easement. This popular option allows the owner to retain title of the property and to exercise certain property rights, including control of access to the public. At the owner's discretion, other rights, such as the right to develop the site, can be deeded over to a recognized conservation organization established to preserve such land in a natural condition. Conservation easements can be sold or donated, and they can confer State and Federal tax benefits to the owner. There are two local land trusts operating in the county. For more information about sites in the county, especially in the sandhills portion, contact the Sandhills Area Land Trust, 140-A SW Broad Street, P.O. Box 1032, Southern Pines, NC 28388; website: <<http://www.sandhillslandtrust.org>>. As its name implies, the Lumber River Conservancy works to protect tracts along the Lumber River, as well as its tributaries. For more information, contact this organization at P.O. Drawer 1087, Lumberton, NC 28359-1087; website: <<http://www.ctnc.org/landtrusts/lumber.htm>>. In addition, an umbrella organization for local land trusts is The Conservation Trust for North Carolina, P.O. Box 33333, Raleigh, NC 27636-3333; website: <<http://www.ctnc.org>>. This last organization has publications that discuss conservation options for private landowners (Conservation Trust for North Carolina and N.C. Coastal Land Trust 1998, Land Trust Alliance 2003).

The Safe Harbor Program is a program run by the U.S. Fish and Wildlife Service that works with private landowners to improve habitat for Federally listed endangered and threatened species. The Service office in Southern Pines operates a Safe Harbor Program to protect the Federally Endangered red-cockaded woodpecker (*Picoides borealis*) in the state's sandhill region, which includes Scotland County. The Safe Harbor policy's main purpose is to promote voluntary management for listed species on non-Federal property while giving assurances to participating landowners that no additional future regulatory restrictions will be imposed. For additional information, contact the U.S. Fish and Wildlife Service, 140 SW Broad Street, P.O. Box 119, Southern Pines, NC 28388, or check the Safe Harbor website at: <<http://endangered.fws.gov/recovery/harborqa.pdf>>

One state program that offers assistance in achieving forest management goals is the Forest Stewardship Program sponsored by a number of different State and Federal agencies. This management plan offers owners assistance in controlled burning, re-forestation of natural vegetation, and maintenance of vegetative buffer strips along rivers and streams. For more information, contact the Forest Stewardship Coordinator, N.C. Division of Forest Resources, 1616 MSC, Raleigh, NC 27699-1616.

If an owner does wish to part with his or her tract, and donate or sell the land to a conservation organization or agency, there may be State or Federal tax benefits associated with the transfer of the property. Such direct transfer of land to a conservation entity is the simplest and most effective way of ensuring long-term protection of land. In addition to various government agencies that acquire land, the Sandhills Area Land Trust (listed above) also acquires lands. However, the main conservation organization in the state that acquires private land is the North Carolina chapter of The Nature Conservancy, which owns two natural areas in the county. TNC

has a regional office that covers Scotland County and especially the sandhills region; contact them at the TNC Sandhills Project, P.O. Box 206, 140 SW Broad Street, Southern Pines, NC 28388; website: <www.tnc.org/northcarolina>.

BIOLOGICAL SURVEYS AND ENDANGERED SPECIES LAWS

Obtaining landowner permission to survey is an integral part of biological inventory. Occasionally, however, permission to survey on private lands is not granted due to a belief that if a rare species is discovered, restrictions and land-use limitations will be imposed. Clearly, when this occurs the search for scientific information is hindered. A secondary effect of not granting permission to survey is that owners of biologically significant lands do not learn about the conservation options and tax incentives that are available to them. Those who grant permission and are found to own significant lands are given results from the biological survey and, if they wish, are put in contact with an appropriate conservation organization, or are made aware of other management or protection options.

In reality, there is very little reason for landowners to have concerns about the presence of rare species on their land. A summary of federal and state endangered species laws relevant to private landowners was recently prepared by Mark A. Cantrell of the US Fish & Wildlife Service and Kenneth A. Bridle of the Piedmont Land Conservancy in Greensboro, NC. Some of that information is presented below to help dispel concerns that landowners may have about rare species and to provide clarification on potential land-use restrictions.

Federal Law

1. The Endangered Species Act (ESA) protects only plants and animals that are federally listed as endangered or threatened. Since federally listed species are by definition very rare, the likelihood of any occurring on a given tract of private land is very small.
2. The ESA protects federally listed animal species from the potentially harmful actions of private landowners. Because this may lead to restrictions on their use of lands, Congress, the US Fish & Wildlife Service (USFWS), and other partners have worked to develop flexible tools for resolving conflicts. These tools include Section 10 permits, such as habitat conservation plans, safe harbor agreements, and candidate conservation agreements. Federal funds are also available to assist landowners with management and conservation of listed and candidate species (rare federally but not officially listed) on their land. Plants on private land are not subject to provisions of the ESA, unless federal funding or permitting is involved.
3. Engaging in interstate or foreign trade of a federally listed species without a permit is illegal for plants and animals. "Taking" (i.e., harassing, harming, pursuing, hunting, killing, trapping) or possessing illegally taken animals is a violation of the ESA. Removing, digging up, cutting, damaging, or destroying a federally listed plant is illegal on federal lands.
4. Through the habitat conservation planning process, the USFWS may issue a permit so that private landowners may lawfully "take" a federally listed animal species if it is "incidental to and not the purpose of carrying out otherwise lawful activities." These permits are available as long

as the landowner implements an approved habitat conservation plan, and the “taking” does not jeopardize the continued existence of the species. A private landowner is not required to prepare a conservation plan for the “taking” of listed plant species as long as the activity does not involve federal funding or permitting, or is not in violation of other laws.

5. Under the ESA, private developers can obtain permits to legally harm or even kill federally listed species on their property provided that they show that attempts were made to minimize impacts on the species in other ways.

6. The existence of a federally listed plant species on private property has no legal effect on the landowner unless a project requires a federal permit or uses federal funds and will clearly result in adverse impacts to the listed plant. Landowners, individuals, and agencies are prohibited from taking listed animals without authorization, whether the action is private or federally funded.

7. When critical habitat is designated for federally listed species, it applies only to federal actions, not to state or local projects, and not to the actions of private landowners unless there is federal funding or permitting involved.

State Law

1. North Carolina endangered species laws apply to species listed by the state as endangered or threatened.

2. The state plant and animal endangered species laws are modelled after the ESA, in that they prohibit illegal trafficking or poaching of listed species.

3. The state endangered animal species law states that “no rule may be adopted that restricts use or development of private property.”

4. The state endangered plant species law states that “the incidental disturbance of protected plants during agricultural, forestry, or development operations is not illegal so long as the plants are not collected for sale or commercial use.” Collection of federal or state listed plants from public or private land can only be done with the landowner’s written permission and a permit from the NC Department of Agriculture’s Plant Conservation Program.

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SITE DESCRIPTIONS

This section describes the biologically significant sites in Scotland County. The sites are grouped by cluster areas, and generally arranged from north to south. The two large managed areas are listed separately, followed by the four cluster areas, followed by sites that do not fall within any clusters.

Table 1 lists these sites, their site number (for reference on Figures 4 and 5 and in the following descriptions), their Site Significance (as described in the Methods section), and their amount of protection (i.e., conservation ownership). Figures 4 and 5 give only general locations for the sites. Detailed maps of sites are presented with each site description. These are U.S. Geological Survey quadrangle maps at 1:24,000 scale, unless otherwise indicated; quadrangle names are given on the maps.

ORDER OF APPEARANCE:

- I. Sandhills Game Land [Managed Area] *
 - II. Camp Mackall Military Reservation [Managed Area] *
-
- A. Scotland County Sandhills – Northwestern Cluster
 - 1. Nashville Church Road Sandhills
 - 2. Aberdeen Road Sandhills
 - 3. Wilkes Branch Sandhills
 - 4. Old Laurel Hill Road Sandhills
 - B. Scotland County Sandhills – Western Cluster
 - 5. Currie Road/Crawford Lake Road Sandhills
 - 6. Highland Road Sandhills
 - C. Scotland County Sandhills – Northeastern Cluster
 - 7. Upper Hills Creek Sandhills
 - 8. Watery Branch Sandhills
 - 9. Naomi Church Sandhills
 - 10. Hills Creek Road Sandhills
 - 11. Horseshoe Road Sandhills
 - 12. Wagram Borrow Pit Amphibian Site
 - D. Upper Lumber River Cluster
 - 13. Drowning Creek/Quewhiffle Creek Floodplain
 - 14. Lumber River/Drowning Creek Flatwoods and Swamp
 - 15. Lumber River/Chalk Banks Flatwoods and Pocosins
 - 16. Upper Lumber River Swamp
 - 17. Lumber River/Bear Swamp Aquatic Habitat

Stand-alone Sites [not within a cluster]

18. Juniper Creek Cedar Swamps
19. Jordan Creek Floodplain
20. Riverton Road Bay Rim
21. McIntosh Bay Complex
22. Little Juniper Creek Bay
23. Shoe Heel Creek Floodplain
24. Shoe Heel Creek Sand Ridge
25. Richmond Mill Natural Area
26. Green Pond Bay Rim
27. Lytch's Pond
28. Johns Pond/Leith Creek Swamp
29. Scotch Meadows Bay Complex
30. Good News Bay
31. Stateline Prairie Bay

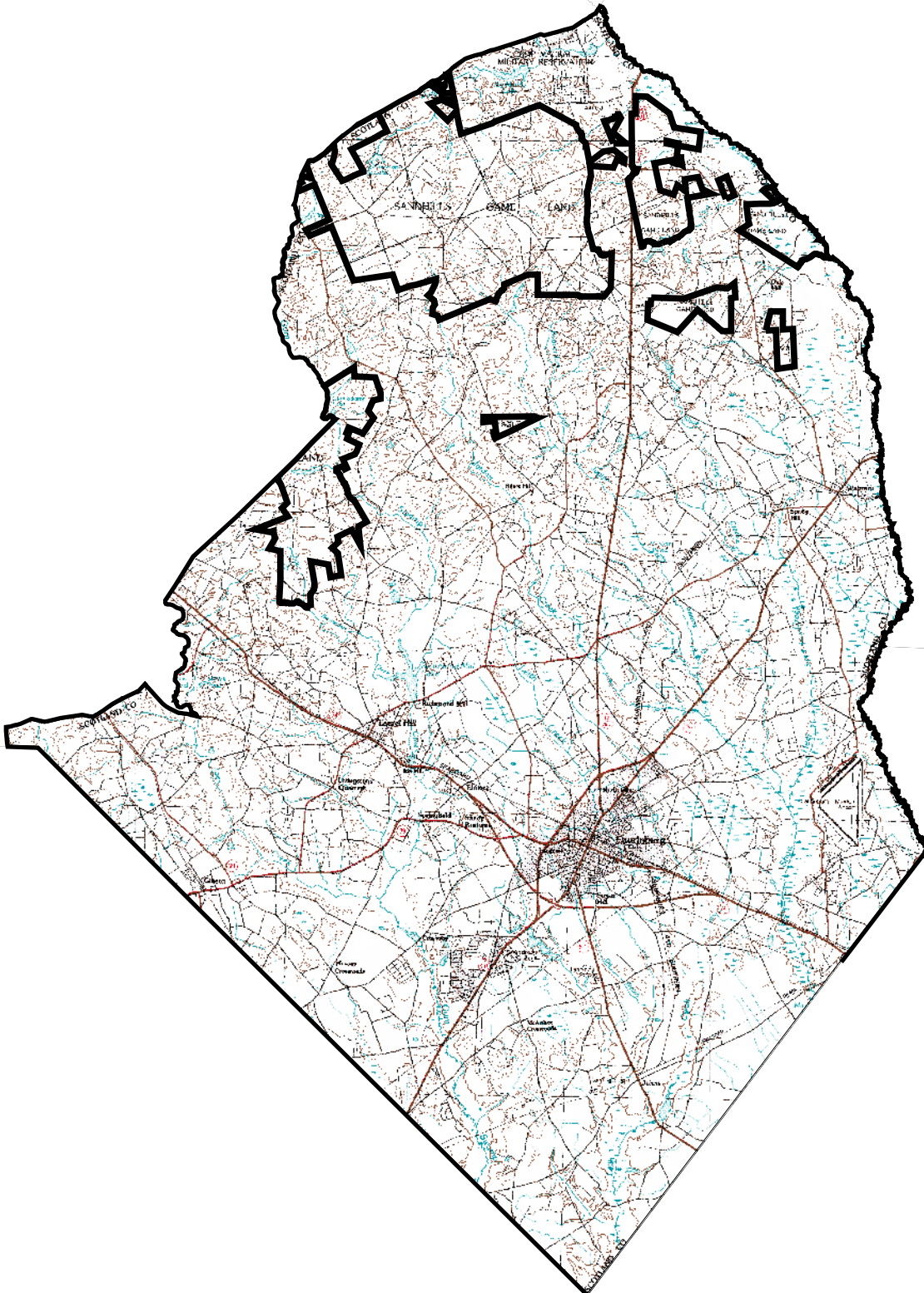
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The Sandhills Game Land and Camp Mackall managed areas contain many standard sites previously identified by NC NHP but not listed here, nor described in detail in this report, because they are completely within conservation land ownership. These previously identified sites are listed within the appropriate cluster area: Camp Mackall sites within the Scotland County Sandhills – Northwestern Cluster, and the Sandhills Game Land sites within one of the four clusters. The sites on this list (and described in the report) for these four clusters are ones that (1) contain some or all private land and thus are not fully in conservation ownership, or (2) are completely within the Game Land but which have not been well studied and described previously and which lie adjacent to private land that could be added to the Game Land in the future.

Sandhills Game Land
Scotland County Natural Areas Inventory

Scale 1:200,000

NC NHP February 2005



Scotland County Natural Areas Inventory

SANDHILLS GAME LAND [MANAGED AREA]

Site Number: I

Size: 59,498 acres total (includes Moore and Richmond counties); 22,546 acres in Scotland County

Site Significance: National

Quadrangles: [Scotland County portion]

Ownership: N.C. Wildlife Resources Commission

Gibson, Hoffman, Marston, Pinebluff, Silver Hill, Wagram

SIGNIFICANT FEATURES (from Sorrie 2001): “Sandhills Game Land is one of the premier natural landscapes in the southeastern United States. SGL has large size, a mostly intact ecosystem, a wide range of high quality plant community types, a high diversity of plant and animal life, and presence of many rare species (state and federal). Moreover, management and ecological processes occur on a landscape scale. SGL lies within the Sandhills Physiographic Region, which occupies a narrow zone at the western edge of the coastal plain extending from about Sanford, NC southwestward to Columbus, GA. The great majority of this region has been highly altered by forest conversion, farming, urban and suburban development, etc., leaving relatively few natural areas of large size. Remaining large areas which support good to high quality ecosystems are almost all on military or public land: Fort Bragg (NC), Camp Mackall (NC), Sandhills Game Land (NC), Sand Hills State Forest (SC), Sandhills National Wildlife Refuge (SC), Fort Gordon (near Augusta, GA), Fort Benning (near Columbus, GA). With the exception of Fort Bragg, none of these properties equals SGL in its ecological significance.

“Given current levels of management, the significance of SGL can only improve, as more and more acres of the longleaf ecosystem in private hands are developed or converted to plantations. Already we have lost forever the continuous mantle of longleaf pines across the coastal plain landscape; in its place we have a patchwork of isolated sites in natural condition, which will only become more isolated from each other in the future. This has important implications regarding interbreeding of populations (genetic exchange) and species viability over the long term. In areas such as the North Carolina Sandhills, we are fortunate to have several preserves in close proximity, thus forming a “population pool” for each species. If a population in one area declines, there probably are sufficient populations nearby to replenish it. Also, protection (through easement or otherwise) of intervening properties can provide valuable corridors for species movements.”

As of early 2005, roughly 40 rare plants and 30 rare animals have been documented from SGL. One of the animals is Federally Endangered: red-cockaded woodpecker (*Picoides borealis*). Three of the plants are Federally Endangered: rough-leaf loosestrife (*Lysimachia asperulifolia*), Michaux’s sumac (*Rhus michauxii*), and chaffseed (*Schwalbea americana*). Over 970 plant species have been documented (Sorrie 1998). Some of the plant communities found here rank among the best of their kind anywhere; these include the common Xeric Sandhill Scrub,

Pine/Scrub Oak Sandhill (several variants), and Streamhead Pocosin, plus the relatively rare Vernal Pool, Small Depression Pocosin, and Streamhead Atlantic White Cedar Forest.

LANDSCAPE RELATIONSHIPS: Camp Mackall lies immediately adjacent to the game land and straddles the Scotland-Richmond county line; most the game land lies to the south and west of the military land. The Game Land extends well north into Moore County. Fort Bragg lies about 6 miles to the east of the Game Land, at their closest points.

SITE DESCRIPTION (from Sorrie 2001): “The Sandhills Game Land comprises approximately 57,500 acres in the Fall-line Sandhills (= Sandhills Region) of the inner coastal plain. Although the actual piedmont boundary lies several miles to the west, a few areas in westernmost SGL, notably along Rocky Fork Creek, represent local exposures of piedmont rocks and soils. As might be expected, many plants found in these piedmont sites are absent from coastal plain soils and vice-versa.

“Compared with the rest of the coastal plain, topography in the Sandhills is varied, with elevations in SGL ranging from 230 to 550 feet above sea level. Most drainage creeks lie 50-90 feet below the surrounding hilltops and plateaus. Creeks and streamheads are abundant. Northern and eastern parts of SGL are drained by Drowning Creek and its major tributary Naked Creek. They merge on SGL property and continue for several miles before becoming the Lumber River, which in turn empties into the Little Pee Dee River. The southwestern part of the study area is drained by Hitchcock Creek and its tributaries (including Rocky Fork Creek and Beaver Dam Creek) and drains into the Great Pee Dee River. All SGL creeks originate in the coastal plain and characteristically are dark tea colored (due to high tannin content); they are properly termed blackwater streams.

“Uplands are composed of Ailey-Wakulla-Candor soils. These are well-drained sands and loamy sands, generally coarser and drier (xeric) on ridges, divides, and hilltops, generally finer and mesic on slopes. Soils in slight depressions (pea swales or bean dips), former streamheads (dry troughs), and broad flats on uplands are notable for their loamy content. Subsoils may be sandy throughout, or have a clay or fine loam layer. Soils of the creek floodplains are classed as Johnston mucky loam and contain considerable organic matter.

“The dominant vegetation of the uplands is longleaf pine (*Pinus palustris*) with scrub oaks in the understory and wiregrass (*Aristida stricta*) blanketing the ground. Depending on soil nutrients and moisture, oaks may occur in monospecific stands such as turkey oak (*Quercus laevis*) or in mixed assemblages of turkey oak, dwarf post oak (*Q. margarettiae*), blackjack oak (*Q. marilandica*), and bluejack oak (*Q. incana*). Scattered individuals of a number of other small hardwood trees also occur, especially persimmon (*Diospyros virginiana*) and sassafras (*Sassafras albidum*). Shrubs vary greatly in cover from zero to dense patches; all are kept short by recurring fires. Similarly, herb diversity varies greatly depending on soil nutrients and moisture; diversity is highest in loamy soils of flat areas and swales.

“In the northwestern part of SGL, exposures of piedmont rocks and soils occur, especially along Rocky Fork Creek. Slopes there support a more mesophytic flora, including many herbs absent eastward. Wiregrass disappears and longleaf pine is uncommon, while mountain laurel (*Kalmia latifolia*) and Christmas fern (*Polystichum acrostichoides*) are numerous.

“Moisture percolating through the soil eventually is forced to the surface by underlying clay layers, forming seeps and streamheads. Over most of SGL this transition zone is narrow--upland wiregrass quickly gives way to a shrub-cane ecotone, in turn replaced by a dense tree/shrub streamhead with flowing water. Occasionally the transition is broad, with patches of shrubs alternating with grass-herb openings, or forming a gradual shift from wiregrass and dry-mesic upland species to bushy broomsedge (*Andropogon glomeratus*) and wet soil species. Ericaceous shrubs are characteristic of streamheads (e.g., fetterbush, *Lyonia lucida*) and ecotones (e.g., blue huckleberry, *Gaylussacia frondosa*), usually mixed with cane (*Arundinaria tecta*). Pond pine (*Pinus serotina*) and yellow poplar (*Liriodendron tulipifera*) are prominent, joined downstream by swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*), and Atlantic white cedar (*Chamaecyparis thyoides*). Ecotones support a wide array colorful herbs, grasses, and sedges; these are critical habitats for rare plants which depend on recurring fires for survival.

“Downstream, where creeks develop floodplains, swamp forests of mixed hardwoods and loblolly pine (*Pinus taeda*) occur. Some of these have been dammed to form impoundment lakes. These lakes, as well as natural beaver impoundments, support many aquatic and emergent plants not found in other SGL habitats, including several rare species.

“A number of upland depressions hold water periodically or permanently. Unlike impoundments there is no inlet nor outlet, so that water levels fluctuate greatly; most are dry in summer and are termed Vernal Pools. The largest, Seventeen Frog Pond (in Scotland County), supports enough obligate aquatic plants to be termed a Small Depression Pond. The cyclical hydrology of these wetlands, coupled with occasional fires through the basin, results in distinct assemblages of grasses, sedges, and herbs to the actual or near exclusion of woody species.” [NOTE: The NC NHP considers Seventeen Frog Pond – called “Bog Hole” by that program and in this Scotland County inventory – to be an example of a Vernal Pool, transitional to a Small Depression Pond.]

MANAGEMENT AND PROTECTION: SGL is a protected area which is managed for natural ecosystems, wildlife, hunting, and also for bird dog trials (in the Richmond County portion). Current management calls for prescribed burns every three years over most of the property. A total of 14 sites on the Game Land have additional protection as Registered Natural Heritage Areas.

NATURAL COMMUNITIES: Xeric Sandhill Scrub, Pine/Scrub Oak Sandhill (including Blackjack variant, Mixed Oak variant, and Mesic Transition variant), Dry Oak-Hickory Forest*, Mesic Mixed Hardwood Forest*, Piedmont/Coastal Plain Heath Bluff*, Mesic Pine Flatwoods, Wet Pine Flatwoods, Peatland Atlantic White Cedar Forest, Streamhead Atlantic White Cedar Forest, Sandhill Seep, Streamhead Pocosin, Pond Pine Woodland, Small Depression Pocosin,

Vernal Pool, Cypress-Gum Swamp (Blackwater subtype), Coastal Plain Bottomland Hardwoods (Blackwater subtype), Coastal Plain Small Stream Swamp (Blackwater subtype), Coastal Plain Semipermanent Impoundment. [* = Apparently found only in Richmond or Moore County portions of SGL]

RARE PLANTS: scale-leaf gerardia* (*Agalinis aphylla*), branched gerardia (*Agalinis virgata*), sandhills milk-vetch (*Astragalus michauxii*), savanna campylopus (*Campylopus carolinae*), silvery sedge (*Carex canescens* ssp. *disjuncta*), bog oatgrass (*Danthonia epilis*), Robbins's spikerush (*Eleocharis robbinsii*), resinous boneset (*Eupatorium resinosum*), sandhills gaillardia (*Gaillardia aestivalis*), soft milk-pea (*Galactia mollis*), Heller's rabbit tobacco (*Gnaphalium helleri* var. *helleri*), sarvis holly (*Ilex amelanchier*), white wicky (*Kalmia cuneata*), Earle's blazing-star (*Liatris squarrulosa*), sandhills lily (*Lilium pyrophilum*), bog spicebush (*Lindera subcoriacea*), shrubby seedbox (*Ludwigia suffruticosa*), southern water grass (*Luziola fluitans*), rough-leaf loosestrife (*Lysimachia asperulifolia*), pinebarren smokegrass* (*Muhlenbergia torreyana*), mudbank crown grass (*Paspalum dissectum*), showy milkwort (*Polygala grandiflora*), hairy smartweed* (*Polygonum hirsutum*), Conferva pondweed (*Potamogeton confervoides*), Michaux's sumac (*Rhus michauxii*), southern white beaksedge (*Rhynchospora macra*), long-beak baldsedge* (*Rhynchospora scirpoides*), sandhills wild-petunia (*Ruellia ciliosa*), azure sage* (*Salvia azurea*), Canby's bulrush (*Schoenoplectus etuberculatus*), swaying bulrush (*Schoenoplectus subterminalis*), chaffseed (*Schwalbea americana*), Huger's carrion-flower* (*Smilax hugeri*), spring-flowering goldenrod (*Solidago verna*), water dawnflower (*Stylisma aquatica*), Pickering's dawnflower (*Stylisma pickeringii* var. *pickeringii*), Carolina triodia (*Tridens carolinianus*), Chapman's yellow-eyed-grass (*Xyris chapmanii*), fanleaf yellow-eyed-grass* (*Xyris flabelliformis*), roughleaf yellow-eyed-grass (*Xyris scabrifolia*). [* = found only in Richmond or Moore County portions of SGL]

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*), dusky roadside-skipper (*Amblyscirtes alternata*), reversed roadside-skipper (*Amblyscirtes reversa*), Mabey's salamander (*Ambystoma mabeei*), eastern tiger salamander (*Ambystoma tigrinum*), a stonefly* (*Atteneuria ruralis*), oak toad (*Bufo quercicus*), Hessel's hairstreak (*Callophrys hesseli*), frosted elfin (*Callophrys irus*), timber rattlesnake (*Crotalus horridus*), thinlip chub* (*Cyprinella* sp. 1), chicken turtle (*Deirochelys reticularia*), pinewoods darter (*Etheostema mariae*), northern oak hairstreak* (*Fixsenia favonius ontario*), dotted skipper (*Hesperia attalus*), Meske's skipper (*Hesperia meskei*), southern hognose snake (*Heterodon simus*), pine barrens treefrog (*Hyla andersonii*), loggerhead shrike (*Lanius ludovicianus*), coachwhip (*Masticophis flagellum*), red-cockaded woodpecker (*Picoides borealis*), northern pine snake (*Pituophis melanoleucus melanoleucus*), ornate chorus frog (*Pseudacris ornata*), Carolina gopher frog (*Rana capito*), King's hairstreak* (*Satyrium kingi*), sandhills chub (*Semotilus lumbee*), pigmy rattlesnake (*Sistrurus miliarius*), a caddisfly* (*Trienodes marginata*). [* = found only in Richmond or Moore County portions of SGL]

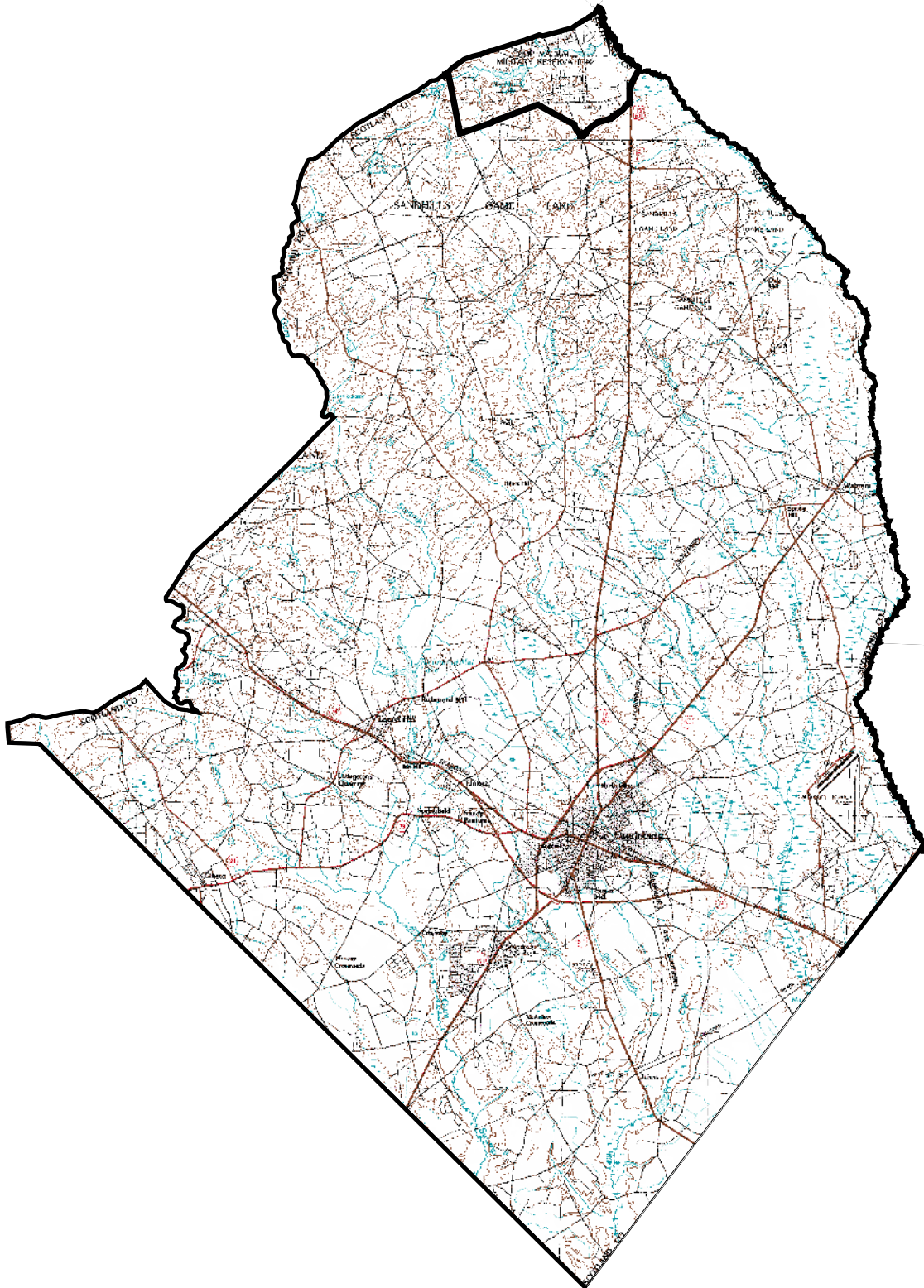
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Camp Mackall Military Reservation
Scotland County Natural Areas Inventory

Scale 1:200,000

NC NHP February 2005



Scotland County Natural Areas Inventory

CAMP MACKALL MILITARY RESERVATION [MANAGED AREA]

Site Number: II

Size: 7,968 acres total (includes Hoke, Moore, and Richmond counties); 4,492 acres in Scotland County

Site Significance: National

Quadrangles: Pinebluff, Silver Hill

Ownership: U.S. Department of Defense

SIGNIFICANT FEATURES: Camp Mackall shares some of the high quality natural features of its larger neighbor, the Sandhills Game Land: well-burned longleaf pine uplands, mature swamp forests along Drowning Creek, streamhead pocosins and ecotones, beaver ponds, and impoundments. Camp Mackall includes a true Carolina bay, a natural feature that the Sandhills Game Land lacks; it occurs in the Scotland County portion. As of early 2005, a minimum of 19 rare plant species and eight rare animals occur on Camp Mackall. The Richmond portion supports the state's largest population of the Federally Endangered Michaux's Sumac (*Rhus michauxii*), while the Scotland portion supports small populations of the Federally Endangered rough-leaf loosestrife (*Lysimachia asperulifolia*). The national champion pond pine (*Pinus serotina*) occurs on base and many large cypresses, gums, and oaks occur along Drowning Creek. Past inventory work on Camp Mackall has identified five natural areas, one of National and four of Regional significance; these are listed within the Scotland County Sandhills – Northwestern Cluster later in this report.

LANDSCAPE RELATIONSHIPS: To the south and west of Camp Mackall lies the Sandhills Game Land. The eastern boundary is Drowning Creek, with farms, residences, woodlands, and US 15-501 beyond. A railroad abuts the northern border, with farms, residences, woodlands, and US 1 beyond. The Richmond/Scotland County line bisects the base.

SITE DESCRIPTION (from Sorrie 2001): "Camp Mackall has gently rolling terrain similar to that of the adjacent Sandhills Game Land. It lies within the Lumber River watershed. Soils are primarily sands and loamy sands. One sizeable stream, Drowning Creek, forms the northeastern boundary; it is a slow-moving, blackwater stream with a broad floodplain supporting typical Coastal Plain Small Stream Swamp vegetation in mature stages. Big Muddy Creek cuts across base and empties into Drowning Creek, but along the way has been dammed twice to form shallow impoundments which support large beds of emergent and floating aquatics. Its upper portions and tributaries support extensive streamhead pocosin communities. Much of the Richmond portion has been cleared for an airfield, barracks, and training facilities; it harbors remnant longleaf pine communities."

PROTECTION AND MANAGEMENT: Fire in the form of prescribed burns every three years is an integral part of management. Populations of Federally Endangered plants and animals are delineated on the ground with signs; troop activities are limited within those areas.

NATURAL COMMUNITIES [incomplete list]: Xeric Sandhill Scrub, Pine/Scrub Oak Sandhill (Mesic Transition and Blackjack variants), Sandhill Seep, Streamhead Pocosin, Small Depression Pocosin, Cypress-Gum Swamp (Blackwater subtype), Coastal Plain Bottomland Hardwoods (Blackwater subtype), Coastal Plain Small Stream Swamp (Blackwater subtype), Coastal Plain Semipermanent Impoundment (human and beaver created).

RARE PLANTS: sandhills milk-vetch (*Astragalus michauxii*), bog oatgrass (*Danthonia epilis*), Robbins's spikerush (*Eleocharis robbinsii*), resinous boneset (*Eupatorium resinosum*), sandhills gaillardia (*Gaillardia aestivalis*), soft milk-pea (*Galactia mollis*), sarvis holly (*Ilex amelanchier*), white wicky (*Kalmia cuneata*), sandhills lily (*Lilium pyrophilum*), bog spicebush (*Lindera subcoriacea*), rough-leaf loosestrife (*Lysimachia asperulifolia*), Carolina grass-of-Parnassus (*Parnassia caroliniana*), showy milkwort (*Polygala grandiflora*), Michaux's sumac (*Rhus michauxii*), long-beak baldsedge* (*Rhynchospora scirpoides*), Canby's bulrush (*Schoenoplectus etuberculatus*), swaying bulrush (*Schoenoplectus subterminalis*), Pickering's dawnflower (*Stylisma pickeringii* var. *pickeringii*), Chapman's yellow-eyed-grass (*Xyris chapmanii*).
[* = found only in Richmond County portion of Camp Mackall]

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*), dusky roadside-skipper (*Amblyscirtes alternata*), lark sparrow (*Chondestes grammacus*), dotted skipper (*Hesperia attalus*), Meske's skipper (*Hesperia meskei*), pine barrens treefrog (*Hyla andersonii*), loggerhead shrike (*Lanius ludovicianus*), red-cockaded woodpecker (*Picoides borealis*), Edwards' hairstreak (*Satyrrium edwardsii*), pigmy rattlesnake (*Sistrurus miliarius*). [A number of other rare reptiles and amphibians are presumed to occur on the base, but NC NHP does not have data for these.]

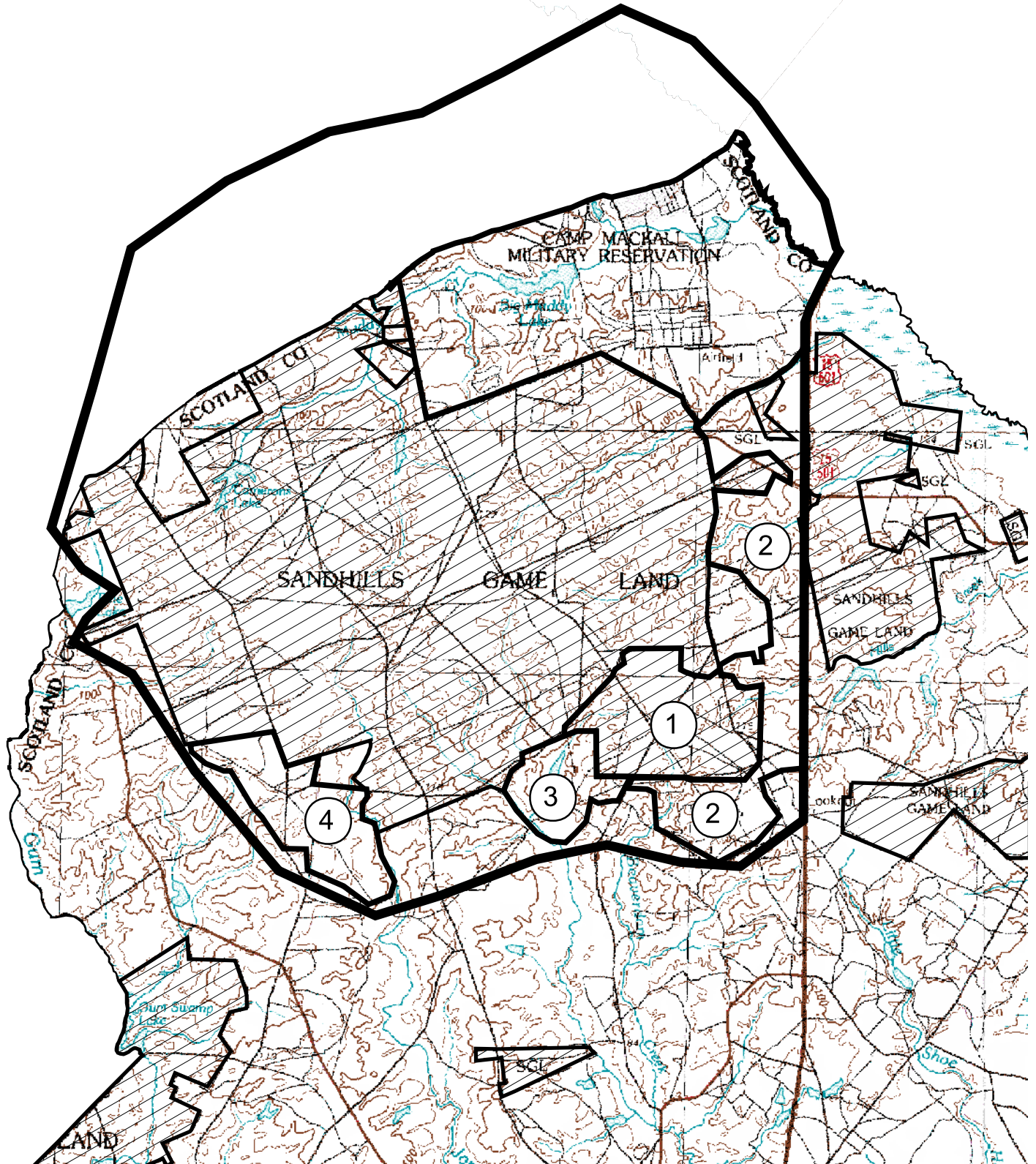
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Scotland County Sandhills -- Northwestern Cluster
Scotland County Natural Areas Inventory

Scale 1:80,000

NC NHP February 2005



Scotland County Natural Areas Inventory

SCOTLAND COUNTY SANDHILLS – NORTHWESTERN CLUSTER

Site Number: A

Site Significance: National

Ownership: N.C. Wildlife Resources Commission,
U.S. Department of Defense, private

Quadrangles: Hoffman, Marston, Pinebluff,
Silver Hill

SIGNIFICANT FEATURES: This cluster – located west of US 15-501 and north of SR 1001 -- contains all of Camp Mackall (that lies in Scotland County) and Block B of the Sandhills Game Land, along with private lands. It contains the most contiguous area of protected land in the county, as the military land and the Game Land share a common boundary, and as Block B is quite large (nearly 7 miles x 5 miles) and has practically no private inholdings. As such, the cluster provides habitat for most of the rare plants and animals found in the Sandhills portion of Scotland County. Fairly large populations of red-cockaded woodpeckers (*Picoides borealis*) and Bachman's sparrows (*Aimophila aestivalis*) are present, and they occur at many of the sites listed below. Several notable features are present, such as the unusual Bog Hole, extensive flats with slight depressions (some containing water for much of the year), and numerous natural and man-made ponds, the shorelines of which contain numerous rare plants.

LANDSCAPE RELATIONSHIPS: This cluster lies directly across (west of) US 15-501 from the Scotland County Sandhills – Northeastern Cluster. The Scotland County Sandhills – Western Cluster lies as close as 1.25 miles to the south-southwest.

SITE DESCRIPTION: This cluster contains the following standard sites previously identified by NC NHP; their significance rank is given in parentheses; SGL = Sandhills Game Land site:

Camp Mackall Drowning Creek Natural Area (State): The site consists of the wide floodplain of Drowning Creek within the military reservation; the natural community is mainly Cypress-Gum Swamp, with some Coastal Plain Bottomland Hardwoods. Near the southeastern corner lies a wetland depression considered to be a Carolina bay; it contains a Small Depression Pocosin natural community.

Camp Mackall Little Muddy Lake (Regional): This man-made lake supports a very diverse emergent and floating vegetation flora, and is a very good example of the Coastal Plain Semipermanent Impoundment community. Three rare plants occur at the site.

Camp Mackall Auxiliary Airfield Buffer (National): Most of this site consists of sandy land surrounding an airfield that is regularly cleared of most woody vegetation. Large numbers of rare plants and butterflies are present, including the largest and most vigorous population in the state of the Federally Endangered Michaux's sumac (*Rhus michauxii*).

Camp Mackall Big Muddy Lake and Tributary (Regional): This is another man-made lake, creating a good example of a Coastal Plain Semipermanent Impoundment. Seven rare plants are known from the lake margin, including a population of the Federally Endangered rough-leaf loosestrife (*Lysimachia asperulifolia*).

Camp Mackall Big Muddy Creek Natural Area (Regional): This natural area contains excellent examples of common communities such as Pine/Scrub Oak Sandhill (Mesic Transition and Blackjack variants), Sandhill Seep, and Coastal Plain Small Stream Swamp. Two rare plants are known, including the only reported site on the reservation for white wicky (*Kalmia cuneata*).

Tucker Lane Woodland (SGL) (State): This relatively small site contains good examples of Xeric Sandhill Scrub and Pine/Scrub Oak Sandhill (Mixed Oak variant). A loamy swale is notable. Several rare plants are known from the site, including the sandhills lily (*Lilium pyrophilum*).

Creek and Corridor below Kinney Cameron Lake (SGL) (Regional): Pocosins occur along an unnamed creek below the lake, and the ecotone with upland sandhills is quite diverse, with four rare plants, including a small population of rough-leaf loosestrife. The pinewoods darter (*Etheostoma mariae*) occurs along the creek.

Beaver Dam Vernal Pool (SGL) (State): This site contains a moderate-sized (50 x 75 meters) natural pool. Several rare plants, most notably water dawnflower (*Stylisma aquatica*), are present, but it is most important for populations of rare amphibians such as Carolina gopher frog (*Rana capito*) and eastern tiger salamander (*Ambystoma tigrinum*).

Beaver Dam Creek Swamp (SGL) (Regional): The site has well-developed, high-quality Coastal Plain Small Stream Swamp and Streamhead Pocosin communities, and an extensive beaver pond. Many rare plants occur at the site.

Pea Swales (SGL) (State): The site has several shallow swales in sandy upland flats, which support excellent examples of Pine/Scrub Oak Sandhill (Mesic Transition variant). The very diverse herb layer supports a number of rare plants, including Michaux's sumac and sandhills wild-petunia (*Ruellia ciliosa*).

Piney Pools North of Little Muddy Creek (SGL) (State): This site contains two small wetlands in small depressions on a nearly flat sandy upland. One is a Small Depression Pocosin that has hardwoods in the canopy and pocosin shrubs, but the second is a Vernal Pool with little woody vegetation. No rare species have been reported, though rare amphibians could be present.

Strausburg Road Pine Woods (SGL) (Regional): The site includes gently rolling uplands with loamy soils, supporting high-quality communities, particularly Pine/Scrub Oak Sandhill (Mesic Transition and Blackjack variants). One of the few populations of sandhills wild-petunia on the Game Land is present at the site.

East Prong Juniper Creek Pocosin and Savanna (SGL) (State): This natural area contains a wide array of natural communities. The Mesic Pine Flatwoods is quite aesthetically pleasing, being open and park-like. Five rare plants are present, including a large population of white wicky.

Still Lane Seepage Slopes (SGL) (State): The site is quite hilly and contains a variety of natural communities. The Sandhill Seeps, present in several locales, are among the best in the state. Four rare plants are present, including bog oatgrass (*Danthonia epilis*).

Jordan Creek Natural Area (SGL) (Regional): The natural area lies along a creek that is rich in amphibians and reptiles along its ecotone and in a woodland “vernal pool”. Mabee’s salamander (*Ambystoma mabeei*) and pine barrens treefrog (*Hyla andersonii*) are known from the site.

Laurel Hill Flats (SGL) (Regional): This natural area is a rolling upland area with several shallow, moist swales or depressions. Two rare plants – showy milkwort (*Polygala grandiflora*) and sandhills wild-petunia – are present.

Laurel Hill Annual Burn (SGL) (Regional): The area has a series of ravines, upland slopes, and flats that have been burned annually for several years. A high-quality Pine/Scrub Oak Sandhill (Mesic Transition variant) is present. Four rare plants are known, including a large population of Carolina triodia (*Tridens carolinianus*); however, the chaffseed (*Schwalbea americana*) reported here as late as 1998 has not been re-located here (in 2000 or 2001) or elsewhere on the Sandhills Game Land.

Scotland Lane Annual Burn Area (SGL) (National): This is a demonstration site that has been burned annually for many years, yielding a very open “savanna” with a very dense and diverse herb layer. Extensive beds of cane are present in the seeps and pocosin of the stream passing through the burned area. Five rare plants are present, along with many more Watch List species, including orchids and pitcher-plants. Seven rare animals are known from the site, including three rare butterflies – dotted skipper (*Hesperia attalus*), Meske’s skipper (*H. meskei*), and reversed roadside-skipper (*Amblyscirtes reversa*).

George Drop Zone Natural Area (SGL) (State): This site lies just west of the drop zone (a cleared area for military training), and it lies in a broad upland area with several loamy swales. Herbaceous plant diversity is very high in the swales, and six rare plants are present, including Michaux’s sumac. Several rare reptiles are also known from the area.

Bog Hole and Uplands (SGL) (National): Probably the most significant geomorphic feature in the Sandhills is this unusually large natural depression, considered as a Vernal Pool in this inventory but perhaps could also be considered as a Small Depression Pond. Bog Hole – which lacks woody vegetation – retains water for much of the year and provides the best habitat for breeding amphibians in the Game Land, especially for Carolina gopher frog and eastern tiger salamander. Several rare plants limited mainly to clay-based Carolina bays are also found here, at least

temporarily; strongly fluctuating water levels cause some species to “disappear” completely after being common in the previous year.

Gardner Farm Lane Woodland (SGL) (State): This site in the heart of Block B contains an array of communities, but it is best noted for its relatively flat topography and mesic swales. It contains good populations of five or six rare plants, especially for sandhills milk-vetch, and a population of Michaux’s sumac is also present.

In addition to the many sites mentioned above, it should be understood that nearly all of the Sandhills Game Land Block B, and much of Camp Mackall, consists of good to excellent natural lands, which are typically burned every few years to maintain the sandhills character of the forests. Thus, one would have a very difficult time delineating sites in such a large, well-maintained landscape, and areas not included in the list of sites above are in many cases just as rich in rare species and good-quality natural communities as the identified sites. For that reason, no map of the sites listed above will be presented in this report, as that would imply that the surrounding “matrix” is not of significance.

Four additional sites are hereby identified within this cluster and are described for the first time, in succeeding pages. These are the Nashville Church Road Sandhills (Site 1), the Aberdeen Road Sandhills (Site 2), the Wilkes Branch Sandhills (Site 3), and the Old Laurel Hill Road Sandhills (Site 4). Site 1 lies wholly within the Game Land, whereas the other three are nearly all on private land.

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- North Carolina Natural Heritage Program. 1981. Sandhills Game Land Natural Areas. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- North Carolina Natural Heritage Program. 2003. N.C. Natural Heritage Program Biennial Protection Plan: List of Significant Natural Heritage Areas, 2003. Office of Conservation and Community Affairs, DENR, Raleigh.
- The Nature Conservancy and N.C. Natural Heritage Program. 1994. Survey for Rare and Endangered Plants on 25,000 Acres of Sandhills Game Land, North Carolina. North Carolina Chapter of The Nature Conservancy, Carrboro, NC; and North Carolina Natural Heritage Program, Division of Parks and Recreation, DENR, Raleigh, NC.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

NASHVILLE CHURCH ROAD SANDHILLS

Site Number: 1

Size: 1,166 acres

Site Significance: Regional

Quadrangle: Silver Hill

Ownership: N.C. Wildlife Resources Commission

SIGNIFICANT FEATURES: This section of Sandhills Game Land is perhaps the flattest of any sizable area in the Game Land. It contains possibly the largest “pea swale” (mesic flat) on the Game Land, and other flats are widespread. Several rare plants and animals are present.

LANDSCAPE RELATIONSHIPS: The natural area fits in-between the Aberdeen Road Sandhills on the east and south, and the Wilkes Branch Sandhills on the southwest. Strausburg Road Pinewoods lies just west of the natural area, and East Prong Juniper Creek Pocosin and Savanna lies immediately to the west. The latter two sites are part of the Sandhills Game Land also, and additional portions of the Game Land (not considered as standard sites) continue northward. Thus, private land bounds the natural area to the east, south, and southwest.

SITE DESCRIPTION: This southeastern corner of Sandhills Game Land Block B had apparently not been heavily studied by biologists in the past, as no specific natural area had been described by NC NHP here. Yet, the sandhills vegetation is quite mature, well-manged by controlled burning, and contains only scattered food plot fields. A few areas northwest of Nashville Church Road (SR 1331), which bisects the site, contains several-acre swales with a diverse herb layer, especially of legumes and composites. This is the Pine/Scrub Oak Sandhill (Mesic Transition variant) natural community. The Watch List eastern prairie-clover (*Dalea pinnata*) is abundant in the swales, and the Piedmont gerardia (*Agalinis decemloba*), also a Watch List species, is present, as well. Rare plants are probably present in the swales, which do not hold water during the year.

The area provides habitat for two butterflies limited in the state essentially to the Sandhills – the dotted skipper (*Hesperia attalus*) and Meske’s skipper (*H. meskei*). A coachwhip (*Masticophis flagellum*) was seen on the survey. Each of these is State Significantly Rare. Rare plant species seen in this part of the Game Land are sandhills milk-vetch (*Astragalus michauxii*), bog oatgrass (*Danthonia epilis*), and white wicky (*Kalmia cuneata*). Several clusters of the Federal Endangered red-cockaded woodpecker (*Picoides borealis*) are present, and birds were seen and heard on each of the two site visits made in fall 2004.

PROTECTION AND MANAGEMENT: The entire site lies within the Sandhills Game Land Block B, owned and managed by the N.C. Wildlife Resources Commission. The area is managed for the woodpecker and for wildlife foraging and cover. A number of small food plots are present, especially in the wedge between Nashville Church Road and Slate Road (SR 1332).

The area is generally well-maintained by prescribed burns every few years. Because of the extent of food plots, it might be recommended to abandon a few of them. It is unfortunate that a large and deep swale, which shows on the topo quad map near the northern end of the site, was part of a cleared area a few decades ago; though now re-vegetating, it has become a dense thicket and not high-quality sandhills vegetation.

NATURAL COMMUNITIES: Pine/Scrub Oak Sandhill (Mesic Transition variant)

RARE PLANTS: sandhills milk-vetch (*Astragalus michauxii*), bog oatgrass (*Danthonia epilis*), white wicky (*Kalmia cuneata*); Watch List – eastern prairie-clover (*Dalea pinnata*), Piedmont gerardia (*Agalinis decemloba*)

RARE ANIMALS: dotted skipper (*Hesperia attalus*), Meske's skipper (*Hesperia meskei*), coachwhip (*Masticophis flagellum*), red-cockaded woodpecker (*Picoides borealis*)

REFERENCES:

LeGrand, H. 2004. Unpublished notes. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

ABERDEEN ROAD SANDHILLS

Site Number: 2

Size: 2,094 acres

Site Significance: Regional

Quadrangles: Pinebluff, Silver Hill

Ownership: multiple private (95%), N.C. Wildlife Resources Commission (5%)

SIGNIFICANT FEATURES: This long sliver of mostly private land contains good examples of common sandhills natural communities, such as Xeric Sandhill Scrub, Pine/Scrub Oak Sandhill, and Streamhead Pocosin. The site contains many rare animal species, including those typical of xeric sandhills but also those of wetlands, including the Carolina gopher frog (*Rana capito*), limited to small pools and ponds.

LANDSCAPE RELATIONSHIPS: This site abuts Camp Mackall on the north, though no specific natural area is identified there. Sandhills Game Land, owned by the N.C. Wildlife Resources Commission, lies along most of the western boundary, though the only specific sites identified are the previously identified Pea Swales and Beaver Dam Creek Swamp, and the newly identified (in this inventory) Nashville Church Road Sandhills. Beaver Dam Creek/Little Muddy Creek Natural Area, Upper Hills Creek Sandhills, and Watery Branch Sandhills – all Sandhills Game Land sites – lie across US 15-501 (Aberdeen Road). The natural area is nearly contiguous with another privately-owned site – Wilkes Branch Sandhills – at the southwestern tip. Thus, the natural area is embedded among natural areas, or other conservation lands, on nearly all sides.

SITE DESCRIPTION: This is a complex of a number of privately owned tracts, mostly in a single ownership, along with a small disjunct section of Sandhills Game Land, lying on the west side of US 15-501, which forms the eastern boundary. Most of the natural area was previously identified by the NC NHP as a Regionally significant site, under the name of the main private owner. (NC NHP has a policy to avoid using names of private owners in site names, unless a site is already under protection; thus, “Aberdeen Road”, rather than the more awkward “US 15-501” name, is used as the descriptor for the site name.)

The majority of the uplands are in good condition and are burned on a regular cycle every few years, presumably for hunting. There are a few abandoned fields, mainly in the northern end of the site, that are regenerating mostly in longleaf pine (*Pinus palustris*). A wet spot at the edge of one field contains a population of the State Threatened and Federal Species of Concern Carolina gopher frog (*Rana capito*). The various longleaf pine uplands contain habitat for the Federal and State Endangered red-cockaded woodpecker (*Picoides borealis*) and State Special Concern Bachman’s sparrow (*Aimophila aestivalis*). Rare snakes on the natural area include the southern hognose snake (*Heterodon simus*) and the northern pine snake (*Pituophis melanoleucus melanoleucus*), both of which are State Special Concern and Federal Species of Concern. The State Significantly Rare pine barrens treefrog (*Hyla andersonii*) has been found in several streamhead pocosins and pond margins. Two State Special Concern fishes, the pinewoods darter

(*Etheostoma mariae*) and the sandhills chub (*Semotilus lumbee*), have been found in Beaver Dam Creek, which forms the northern boundary of the natural area.

Rare plants found in the natural area are the sandhills milk-vetch (*Astragalus michauxii*) and the resinous boneset (*Eupatorium resinosum*). The former is found in typical upland sandhills habitats, whereas the latter requires sunlit wetlands, such as the edges of beaver ponds. Many other rare plants are presumed to be present. Most of the site was surveyed only from US 15-501, though one private tract at the southern end of the natural area was surveyed on foot. The natural area contains a few notable Sandhill Seeps, one of which can be seen along the highway about 0.3 mile north of SR 1331. A great array of “pocosin” shrubs is present, including honey-cups (*Zenobia pulverulenta*), smooth winterberry (*Ilex laevigata*), and coastal witch-alder (*Fothergilla gardenii*).

PROTECTION AND MANAGEMENT: There is a disjunct tract of Sandhills Game Land in the northern tip of the natural area, and a narrow wedge of Game Land is present along US 15-501 in the middle of the site. These can be considered as protected, conservation lands. The remaining 95% of the natural area is privately owned, with no known protection. Nearly all of the northern 80-90% of the natural area is owned by a single individual. As this is an important “strip” of private land surrounded by Sandhills Game Land, it is important for conservation entities to arrange for protection, through acquisition (as an addition to the Sandhills Game Land) or easements. Because there is so much frontage along a highway, such land could easily be sold off for development unless protection is arranged.

Most of the privately owned lands are managed with prescribed burns every few years, which maintains quality habitat for wildlife. It is assumed that some hunting takes place on the tracts. There has been little evidence of pine harvest in recent years, though occasional thinning of mature pines is suitable, as long as foraging habitat for the red-cockaded woodpecker is not impacted, and as long as the herb layer is not heavily damaged.

NATURAL COMMUNITIES: Xeric Sandhill Scrub, Pine/Scrub Oak Sandhill (Mixed Oak variant), Streamhead Pocosin, Sandhill Seep

RARE PLANTS: sandhills milk-vetch (*Astragalus michauxii*), resinous boneset (*Eupatorium resinosum*); Watch List – sandhills milkweed (*Asclepias tomentosa*), buckroot (*Pedimelum canescens*)

RARE ANIMALS: Bachman’s sparrow (*Aimophila aestivalis*), lark sparrow (*Chondestes grammacus*), pinewoods darter (*Etheostoma mariae*), southern hognose snake (*Heterodon simus*), pine barrens treefrog (*Hyla andersonii*), red-cockaded woodpecker (*Picoides borealis*), northern pine snake (*Pituophis melanoleucus melanoleucus*), Carolina gopher frog (*Rana capito*), sandhills chub (*Semotilus lumbee*)

REFERENCES:

- Carter, J.H., III. 1989. Site survey report: Carpenter tracts. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2004. Site report: Nashville Church Road Sandhills. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

WILKES BRANCH SANDHILLS

Site Number: 3

Size: 500 acres

Site Significance: County

Quadrangle: Silver Hill

Ownership: private

SIGNIFICANT FEATURES: This site contains fairly typical sandhills natural communities, most of which has been burned on a regular several-year cycle. There are several notable Sandhill Seeps, and the rare Earle's blazing-star (*Liatris squarrulosa*) is present in the drier portions of them. The State Special Concern Bachman's sparrow (*Aimophila aestivalis*) also is present on the site.

LANDSCAPE RELATIONSHIPS: The natural area abuts Sandhills Game Land on the north and east; though this portion of the Game Land had not previously had specific sites identified by the NC NHP, the portion adjacent to the northeastern boundary of Wilkes Branch Sandhills is described in this inventory as the Nashville Church Road Sandhills. The eastern edge of the natural area lies across Nashville Church Road (SR 1331) from the western end of the Aberdeen Road Sandhills site; thus, significant private lands "touch" across this dirt road, immediately south of the Game Land. About 1.5 miles to the west is another privately-owned natural area known in the inventory as the Old Laurel Hill Road Sandhills.

SITE DESCRIPTION: The area contains two man-made ponds in the center, but the remainder of the site appears to consist of natural sandhills vegetation. Some of the uplands have been fairly heavily thinned, but as controlled burns have been done, there is a very lush herb layer. One or two seeps in the eastern part of the site are very rich; the Significantly Rare Earle's blazing-star (*Liatris squarrulosa*), pine barrens gentian (*Gentiana autumnalis*), Carolina asphodel (*Tofieldia glabra*), coastal false-asphodel (*Tofieldia racemosa*), and large-flowered camas (*Zigadenus glaberrimus*) are showy and uncommon wildflowers found in these wetlands.

Several singing Bachman's sparrows (*Aimophila aestivalis*) have been heard on the site, and the open stands of longleaf pine (*Pinus palustris*), with relatively little scrub oak vegetation, likely provide at least foraging habitat for the red-cockaded woodpeckers (*Picoides borealis*) that nest on the adjacent Game Land.

The natural area was surveyed only from the Sandhills Game Land boundary, and from Pulpwood Lane (a Game Land road that forms the northern boundary of the natural area). Thus, there are expected to be a number of other rare plants and animals found in the natural area, with further survey.

PROTECTION AND MANAGEMENT: The site is in private ownership. The northwestern 45% of the natural area is included within the Safe Harbor Program of the U.S. Fish and Wildlife Service. There is no other protection status known for this natural area. As the site is adjacent to the Sandhills Game Land, it would make a good addition to the Game Land, should the owner(s) wish to sell the land. Otherwise, conservation entities should at a minimum seek conservation or other easements for the land, which would provide more protection than does the Safe Harbor agreement.

The natural area should be managed by prescribed burning of portions on a roughly 3-5 year rotation, which might be the case now. Thinning of pines is acceptable, as long as burns are done within a few years.

NATURAL COMMUNITIES: Sandhill Seep

RARE PLANTS: Earle's blazing-star (*Liatris squarrulosa*); Watch List – Carolina asphodel (*Tofieldia glabra*)

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*)

REFERENCES:

LeGrand, H. 2004. Site report: Wilkes Branch Sandhills. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

OLD LAUREL HILL ROAD SANDHILLS

Site Number: 4

Size: 893 acres

Site Significance: County

Quadrangle: Marston

Ownership: multiple private

SIGNIFICANT FEATURES: The site contains a somewhat unusual area of young, planted pines with a very dense and rather rich herb layer. The ecotone along Jordan Creek is also quite mature and diverse.

LANDSCAPE RELATIONSHIPS: This natural area abuts the Sandhills Game Land on the north and east. The portion to the east is a Registered Natural Heritage Area known as Jordan Creek Natural Area. Just to the north of the site is the Laurel Hill Flats natural area on the Game Land, though it is not registered. The nearest privately-owned natural area is the Wilkes Branch Sandhills about 1.5 miles to the east.

SITE DESCRIPTION: The most significant portion of the site lies just west of the Jordan Creek Natural Area. Several hundred acres were essentially cleared of mature longleaf pines (*Pinus palustris*) one or two decades ago, and most was re-planted in longleaf. Fortunately, the herb layer remained generally intact. The pines are now about 25' tall. The owner has burned a portion of the re-planted area. The soil at the site is somewhat loamy in places, and thus there is more herb diversity than found in typical sandy sites. Poison-oak (*Toxicodendron pubescens*) is the dominant small shrub, and wiregrass (*Aristida stricta*) is abundant. The Watch List lupine scurfpea (*Orbexilum lupinellum*) is quite common in places, along with the infrequently seen pine-woods milkweed (*Asclepias humistrata*). A few individuals of the State Threatened and Federal Species of Concern sandhills milk-vetch (*Astragalus michauxii*) are present.

The ecotone along Jordan Creek is a good example of Streamhead Pocosin natural community. Pond pines (*Pinus serotina*) are common and mature; however, there seems to be an absence of Atlantic white-cedar (*Chamaecyparis thyoides*).

The State Special Concern Bachman's sparrow (*Aimophila aestivalis*) has been reported from the site. Further survey work would be expected to reveal additional rare animal species.

Much of the site was surveyed only from Old Laurel Hill Road (SR 1346) and SR 1351. A considerable area of relatively intact sandhills vegetation lines both sides of the latter road. Likewise, additional sandhills vegetation lies south of the jeep road, opposite the re-planted zone. These areas are included in the natural area boundary but have not been surveyed.

PROTECTION AND MANAGEMENT: The area is in multiple private ownership. A portion, including all of the re-planted pine site, is (or was) part of a large packet of tracts potentially for sale by a timber company a few years ago. Though most of the tracts in that packet are not significant natural areas (such as recently clearcut lands or lands in loblolly pine or slash pine stands), this particular tract has merit and would be a potential acquisition project for the Sandhills Game Land. However, there are other, more mature, sites adjacent to the Game Land that likely would take protection precedence over this site.

The re-planted site should be burned every few years, in order to keep the herb layer thick and diverse. Some of the pine lands elsewhere should be burned to stimulate the herb layer and perhaps open the canopy.

NATURAL COMMUNITIES: Streamhead Pocosin

RARE PLANTS: sandhills milk-vetch (*Astragalus michauxii*); Watch List – lupine scurfpea (*Orbexilum lupinellum*)

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*); Watch List – eastern fox squirrel (*Sciurus niger*)

REFERENCES:

- LeGrand, H. 2002. Summary of Natural Heritage Inventory on International Paper Company tract – 2001-02. Report to The Nature Conservancy. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2004. Site report: Undermine Branch Sandhills. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

SCOTLAND COUNTY SANDHILLS – WESTERN CLUSTER

Site Number: B

Quadrangles: Gibson, Marston

Site Significance: National

Ownership: N.C. Wildlife Resources Commission, private

SIGNIFICANT FEATURES: This cluster is much smaller than the Northwestern Cluster, and it contains all of Sandhills Game Land Block C, plus associated private lands, mainly on the south side of the Game Land. Most of the private land between these two clusters is a “patchwork quilt” of cultivated fields, cut-over lands, scattered homes, and fire-suppressed woodlands. However, this cluster contains a still fairly extensive solid block of protected lands about 5.5 miles long (north-south) and 3.5 miles wide (east-west), with not quite one-fourth of the cluster lapping over into adjacent Richmond County on the west. It contains typical sandhills communities, though many of the rare plants are found around the margins of two large man-made lakes – Gum Swamp Lake and Crawford Lake. The southern portion of the cluster contains quite flat topography with a number of swales, and several enigmatic depressions, probably not Carolina bays, are located on private land just south of the Game Land. Large numbers of rare plants and animals are found in this cluster.

LANDSCAPE RELATIONSHIPS: The Scotland County Sandhills – Northwestern Cluster lies as close as 1.25 miles to the northeast. The stand-alone Richmond Mill Natural Area, containing some sandhills features, lies just over a mile to the southeast of the cluster.

SITE DESCRIPTION: This cluster contains the following standard sites, on Sandhills Game Land (SGL), previously identified by NC NHP; their significance rank is also listed:

Gum Swamp Lake and Tributaries (SGL) (State): The site includes the lake, several creek floodplains, and upland slopes. The area has high-quality Cypress-Gum Swamp and Streamhead Pocosin communities along the creeks. A remarkable 12 rare plant species are reported from the site, in addition to four rare animals.

Crawford Lake Natural Area (SGL) (State): This site is centered on another large man-made lake. Crawford Lake has a marshy shoreline – as do practically all lakes and ponds in the Sandhills – that contains at least five rare plants species, and several more are in nearby streamheads. Of most interest are the Federally Endangered rough-leaf loosestrife (*Lysimachia asperulifolia*) in a streamhead, and the Federally Endangered Michaux’s sumac (*Rhus michauxii*) occurs in nearby uplands.

Currie Road Slopes and Flats (SGL) (Regional): This site is now included within the much larger Currie Road/Crawford Lake Road Sandhills (Site 5) described later in this report.

As with Scotland County Sandhills – Northwestern Cluster, nearly all of the Sandhills Game Land Block C consists of good to excellent natural lands, which are typically burned every few years to maintain the sandhills character of the forests. Thus, delineating sites in such a large, well-maintained landscape is very difficult, and areas not included in the list of sites above are in many cases just as rich in rare species and good-quality natural communities as the identified sites. For that reason, no map of the sites listed above will be presented in this report, as that would imply that the surrounding “matrix” is not of significance.

Two additional sites are hereby identified within this cluster and are described for the first time, in succeeding pages. These are the Currie Road/Crawford Lake Road Sandhills (Site 5) and the Highland Road Sandhills (Site 6). Expanding the “old” Currie Road Slopes and Flats site to include a much larger area has given Currie Road/Crawford Lake Road Sandhills a State significance rating. Whereas this site is essentially all in the Sandhills Game Land, the Highland Road Sandhills is privately owned.

REFERENCES:

- North Carolina Natural Heritage Program. 2003. N.C. Natural Heritage Program Biennial Protection Plan: List of Significant Natural Heritage Areas, 2003. Office of Conservation and Community Affairs, DENR, Raleigh.
- The Nature Conservancy and N.C. Natural Heritage Program. 1994. Survey for Rare and Endangered Plants on 25,000 Acres of Sandhills Game Land, North Carolina. North Carolina Chapter of The Nature Conservancy, Carrboro, NC; and North Carolina Natural Heritage Program, Division of Parks and Recreation, DENR, Raleigh, NC.

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Scotland County Natural Areas Inventory

CURRIE ROAD/CRAWFORD LAKE ROAD SANDHILLS

Site Number: 5

Size: 2,205 acres

Site Significance: State

Quadrangles: Gibson, Marston

Ownership: N.C. Wildlife Resources Commission (98%),
private (2%)

SIGNIFICANT FEATURES: This extreme southern portion of the Sandhills Game Land has several good to excellent examples of Pine/Scrub Oak Sandhill communities, including an excellent example of the Blackjack variant, and a good example of the rare Mesic Pine Flatwoods. It has large populations of several State Significantly Rare butterflies – the dotted skipper (*Hesperia attalus*), Meske's skipper (*H. meskei*), and Hessel's hairstreak (*Callophrys hesseli*); the population of dotted skipper is one of the best in the country. There are many rare plants known from the site, including a population of the Federal Endangered Michaux's sumac (*Rhus michauxii*). The natural area has a high forb diversity, owing to flats, swales, and slight depressions over mesic soils in the northwestern quadrant.

LANDSCAPE RELATIONSHIPS: The Highland Road Sandhills lies along the boundary of this natural area on the southwest. Additional Sandhills Game Land continues northward, though it is not a specifically identified standard site. The Richmond Mill Natural Area lies within 1.3 miles to the southeast.

SITE DESCRIPTION: This description covers essentially all of Sandhills Game Land Block C, south of Crawford Lake (which has already been identified previously as a significant natural area by NC NHP). The description and site boundary includes the recently acquired Breeden Tract, which lies just west of Little Beaverdam Creek and north of Highland Road (SR 1323). A small area of private land, to the south, includes a powerline clearing and a stand of Atlantic white-cedar (*Chamaecyparis thyoides*) along Bass Branch.

This natural area is bisected by the north-south Crawford Lake Road and east-west by Currie Road into four quadrants, with the southwestern being the largest. The northwestern quadrant is the most noteworthy for rare species, as much of the longleaf pine (*Pinus palustris*) has been removed and is just re-germinating, yielding open areas with a lush herb layer. Much of the area in the quadrant is a flat "bowl" of Pine/Scrub Oak Sandhill (Mesic Transition variant). Longleaf pine is scattered, and various oaks have been hit hard by a hot fire. Tall ironweed (*Vernonia angustifolia*) is a dominant forb, but various thoroughworts (*Eupatorium* spp.) are common. Two small areas to the northwest are quite diverse in herbs; notable species here include the Significantly Rare showy milkwort (*Polygala grandiflora*), the Watch List eastern prairie-clover (*Dalea pinnata*), prostrate rattlebox (*Crotalaria rotundifolia*), and Pursh's rattlebox (*Crotalaria purshii*). One swale closer to Currie Road has a population of the Federal Endangered Michaux's sumac (*Rhus michauxii*).

A small area in the northeastern quadrant, just west of Gum Swamp Creek, is a Mesic Pine Flatwoods, scarce in the Sandhills region. This is a slightly damp flat at the base of a slope. A rich floral display is present, mostly of meadow-beauties (*Rhexia alifanus*, *R. mariana*) and various composites.

The southwestern quadrant consists of a wide mix of habitats and topography, and it includes the Currie Road Slopes and Flats site identified by the NC NHP. This NHP site, located in the northern part of the quadrant, contains Pine/Scrub Oak Sandhill communities, including an excellent example of the Blackjack variant, and a good example of the rare Mesic Pine Flatwoods.

Unlike the western half of the natural area, nearly all of the southeastern quadrant and most of the northeastern quadrant is Xeric Sandhill Scrub. Much of these areas were thinned in the past, and canopies of the longleaf pine often do not touch. Turkey oak (*Quercus laevis*) dominates the understory, but in many areas hot fires have scorched the oaks. The shrub layer is mainly dense stands of dwarf huckleberry (*Gaylussacia dumosa*). Herbs are not diverse; the primary forbs are goat's-rue (*Tephrosia virginiana*) and sandhills chaffhead (*Carphephorus bellidifolius*).

As expected in such a large area, other communities are present: Streamhead Pocosin, a beaver pond (Coastal Plain Semipermanent Impoundment) upstream of Crawford Lake, a few Sandhill Seeps on slopes just south of Crawford Lake, and probably others. One or two stands of white-cedars south of Highland Road, both on the Game Land and off, might approach a Streamhead Atlantic White Cedar Forest natural community.

PROTECTION AND MANAGEMENT: Nearly 98% of the site is in conservation ownership, owned and managed by the N.C. Wildlife Resources Commission, as Sandhills Game Land Block C. The natural area incorporates private land just south of the Game Land. A portion of the Game Land is excluded from the natural area, as there are fields and disturbed forest lands west of Crawford Lake Road, south of Currie Road.

A portion of the Game Land in the northwestern quadrant consists of food plot fields. These fields are managed for game species such as mourning dove (*Zenaida macroura*); a few food plot fields lie elsewhere on the natural area. The Breeden tract contains a small man-made lake. Fortunately, the Commission has done an excellent job of burning most of the block on a several-year rotation, so that the herb layer looks lush and diverse.

The section south of Highland Road has not had much if any recent prescribed fires. This area does need to be maintained, though a subdivision is currently being built just east of this section. Nonetheless, Bass Branch and the powerline clearing contain much white-cedar and potential for savanna plant species, and the Commission might look into acquisition of land here, though it would not be a high priority.

NATURAL COMMUNITIES: Pine/Scrub Oak Sandhill (Mesic Transition and Blackjack variants), Xeric Sandhill Scrub, Mesic Pine Flatwoods, Streamhead Pocosin, Sandhill Seep, Coastal Plain Semipermanent Impoundment

RARE PLANTS: sandhills milk-vetch (*Astragalus michauxii*), sandhills gaillardia (*Gaillardia aestivalis*), white wicky (*Kalmia cuneata*), showy milkwort (*Polygala grandiflora*), Michaux's sumac (*Rhus michauxii*), twisted-leaf goldenrod (*Solidago tortifolia*) (historic record), Carolina triodia (*Tridens carolinianus*); Watch List – eastern prairie-clover (*Dalea pinnata*)

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*), Hessel's hairstreak (*Callophrys hesseli*), pinewoods darter (*Etheostoma mariae*), dotted skipper (*Hesperia attalus*), Meske's skipper (*Hesperia meskei*), red-cockaded woodpecker (*Picoides borealis*)

REFERENCES:

- LeGrand, H. 2003a. Site report: Sandhills Game Land – Block C (S and SE of Crawford Lake). N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2003b. Site report: Sandhills Game Land – Block C (south of Currie Road and Crawford Lake; includes the Currie Road Slopes and Flats natural area). N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2003c. Site report: Sandhills Game Land – Block C (extreme southern portion). N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- Schafale, M. 1999. Site survey report: Currie Road Slopes and Flats, Sandhills Game Land. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

HIGHLAND ROAD SANDHILLS

Site Number: 6

Size: 691 acres

Site Significance: Regional

Quadrangle: Gibson

Ownership: private

SIGNIFICANT FEATURES: The natural area contains a large amount of typical upland sandhills vegetation, but has two unusual wetland depressions containing pocosin vegetation. One area has a notably mesic flora with uncommon plants and one of the larger state populations of a rare butterfly – dusky roadside-skipper (*Amblyscirtes alternata*).

LANDSCAPE RELATIONSHIPS: The natural area abuts the Sandhills Game Land on the north and east; this portion of the game land is the Currie Road/Crawford Lake Road Sandhills natural area. The nearest privately-owned natural area is roughly 2 1/4 miles to the east-southeast -- Richmond Mill Natural Area.

SITE DESCRIPTION: The eastern half of the natural area consists of medium-growth sandhills vegetation dominated by longleaf pine (*Pinus palustris*). This area contains more bluejack oak (*Quercus incana*) and scrub post oak (*Q. margaretta*) relative to the typically dominant turkey oak (*Q. laevis*) than in most parts of the sandhills region. Blackjack oak (*Q. marilandica*) is also widespread.

The western half, which contains a number of stands of loblolly pine (*Pinus taeda*) and dense longleaf pine stands, among scattered fields, has a few unusual spots. There are at least three depressions, two of which hold water for most or all of the year; they might be Carolina bays, but there are no conclusive Carolina bays known from the Sandhills region. Were they burned on a several-year rotation, there might be significant zones of herbs or small shrubs; however, decades of fire suppression has converted these presumed Vernal Pools into wetland thickets. The southern depression is now a dense and impenetrable stand of red maple (*Acer rubrum*) over shrub thickets of titi (*Cyrilla racemiflora*) and smaller evergreen pocosin species. There is, however, a locally dominant stand of honey-cups (*Zenobia pulverulenta*) along the southeastern margin. The northern depression, which indeed held open water and an herb zone in a 1979 survey, is now a dense shrub thicket, perhaps with no opening in the center. Red maple and titi are also dominants now. Of interest near the bay are dense patches of pyxie-moss (*Pyxidanthera barbulata*), quite rare in the Sandhills portion of the county.

Just northeast of the southern bay is a more mesic “flats”, where the Watch List sandhills bean (*Phaseolus sinuatus*) and lax blazing-star (*Liatris secunda*) are common. A colony of the State Significantly Rare dusky roadside-skipper (*Amblyscirtes alternata*) butterfly was found on the survey; this is a scarce species, and usually only single individuals are found at any given site in the Sandhills region.

Rare snakes presumably occur on the tract because of its relatively large size. Two species – the State Significantly Rare coachwhip (*Masticophis flagellum*) and the State Special Concern and Federal Species of Concern northern pine snake (*Pituophis melanoleucus melanoleucus*) – have been found along Highland Road as road-kills.

PROTECTION AND MANAGEMENT: This site is in a single ownership. The company that owns the tract has a land manager who conducts prescribed burns on occasion. The tract is used for occasional hunting, timber harvest, and pine straw raking. For the most part, the natural area is in good condition, though more frequent burning could be done. This would be a good tract for a conservation easement, unless the owner wishes to sell, for which the tract would make an excellent addition to the bordering Sandhills Game Land.

NATURAL COMMUNITIES: Pine/Scrub Oak Sandhill (Mixed Oak and Mesic Transition variants), Vernal Pool

RARE PLANTS: Watch List – lax blazing-star (*Liatris secunda*), sandhills bean (*Phaseolus sinuatus*)

RARE ANIMALS: dusky roadside-skipper (*Amblyscirtes alternata*), coachwhip (*Masticophis flagellum*), northern pine snake (*Pituophis melanoleucus melanoleucus*)

REFERENCES:

- Carter, J.H., III. 1979. Unpublished report on selected Carolina bays. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2003. Site report: Z.V. Pate, Inc. tracts. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

SCOTLAND COUNTY SANDHILLS – NORTHEASTERN CLUSTER

Site Number: C

Quadrangles: Pinebluff, Silver Hill

Site Significance: National

Ownership: N.C. Wildlife Resources Commission,
N.C. Department of Transportation, private

SIGNIFICANT FEATURES: This cluster – located east of US 15-501 -- contains all of the Sandhills Game Land Blocks D (except for a sliver west of this highway), F, G, and H, and the upland portion of Block E. Block D is a modestly large block of protected land roughly 3.25 miles long (north-south) but only slightly more than a mile in width (east-west). Blocks F and E are medium-sized tracts nearly 1000 acres in size. As with the other two Sandhills clusters, this one contains fairly typical topography, with rolling hills, streamheads, upland swales or depressions, and a man-made lake or two. Block D contains the largest extent of loamy soil on the Game Land, and this block, Block F, and private land near the Naomi Church contain notable Vernal Pools and Small Depression Pocosins.

LANDSCAPE RELATIONSHIPS: This cluster lies directly across (east of) US 15-501 from the Scotland County Sandhills – Northwestern Cluster. The Upper Lumber River Cluster forms the eastern boundary of the Northeastern Cluster. Thus, this cluster of land is adjacent to two other clusters, forming extensive acreages of high-quality habitats across the northeastern portion of Scotland County, extending northward across Drowning Creek into Hoke County.

SITE DESCRIPTION: This cluster contains the following standard site, completely on the Sandhills Game Land (SGL), previously identified by NC NHP; its significance rank is also listed:

Beaver Dam Creek/Little Muddy Creek Natural Area (SGL) (National): The natural area contains diverse, excellent quality natural communities, including extensive examples of “pea swale” Pine/Scrub Oak Sandhill (Mesic Transition variant). The northeastern edge contains Wet Pine Flatwoods along the upper terrace of Drowning Creek. At least 10 rare plants are present, including a large population of the Federally Endangered Michaux’s sumac (*Rhus michauxii*). Several clusters of red-cockaded woodpeckers (*Picoides borealis*) also occur on the natural area.

In addition to the site mentioned above, nearly all of the Sandhills Game Land Blocks D, E, F, and G consist of good to excellent natural lands, which are typically burned every few years to maintain the sandhills character of the forests. Thus, one would have a very difficult time delineating sites in such a large, well-maintained landscape, and areas not included in the site above are in many cases just as rich in rare species and good-quality natural communities as the identified site. For that reason, no map of the site listed above will be presented in this report, as that would imply that the surrounding “matrix” is not of significance.

Six additional sites are hereby identified within this cluster and are described for the first time, in succeeding pages. These are the Upper Hills Creek Sandhills (Site 7), the Watery Branch Sandhills (Site 8), the Naomi Church Sandhills (Site 9), the Hills Creek Road Sandhills (Site 10), the Horseshoe Road Sandhills (Site 11), and the Wagram Borrow Pit Amphibian Site (Site 12). Site 7, which lies mostly on the Game Land, includes the southern end of the “old” Beaver Dam Creek/Little Muddy Creek Natural Area. Site 8 consists almost solely of Sandhills Game Land Block F, and Site 11 consists almost solely of Sandhills Game Land Block G. Sites 9 and 10 contain some Game Land but are mostly private lands. Site 12 is owned by the N.C. Department of Transportation.

REFERENCES:

- North Carolina Natural Heritage Program. 1981. Sandhills Game Land Natural Areas. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- North Carolina Natural Heritage Program. 2003. N.C. Natural Heritage Program Biennial Protection Plan: List of Significant Natural Heritage Areas, 2003. Office of Conservation and Community Affairs, DENR, Raleigh.
- The Nature Conservancy and N.C. Natural Heritage Program. 1994. Survey for Rare and Endangered Plants on 25,000 Acres of Sandhills Game Land, North Carolina. North Carolina Chapter of The Nature Conservancy, Carrboro, NC; and North Carolina Natural Heritage Program, Division of Parks and Recreation, DENR, Raleigh, NC.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

UPPER HILLS CREEK SANDHILLS

Site Number: 7

Size: 1,089 acres

Site Significance: Regional

Quadrangle: Silver Hill

Ownership: N.C. Wildlife Resources Commission (95%),
private (5%)

SIGNIFICANT FEATURES: The southern half of the natural area contains a significantly diverse “mesic ridge” and an adjacent swale, where three rare plants are found. In addition, three rare graminoids have been found along the shoreline of a man-made pond at the southeastern corner of the tract, and four additional rare plants are known from the entire natural area. The northern half of the site contains several notable wetlands, including Vernal Pools and a remnant beaver pond that has “created” several Small Depression Pocosins and Wet Pine Flatwoods.

LANDSCAPE RELATIONSHIPS: The former southern end of the Beaver Dam Creek/Little Muddy Creek Natural Area, south of SR 1400 (Hills Creek Road), is now a part of this new natural area. Thus, this natural area has Hills Creek Road as a northern boundary, across which is Beaver Dam Creek/Little Muddy Creek Natural Area (Sandhills Game Land). Across US 15-501 to the west is the Aberdeen Road Sandhills. Naomi Church Sandhills lies within 1/4-mile to the northeast, across Hills Creek Road. Additional sandhills sites lie within 1.25 miles to the east and south, across disturbed private lands.

SITE DESCRIPTION: This natural area consists of the southern half of Sandhills Game Land Block D, plus a small amount of private lands along the margins that are in good condition. The NC NHP had previously not identified this portion as a significant natural area, except for tributaries of Little Muddy Creek. Most of the natural area contains fairly typical topography and sandhills vegetation. That is, there are several streams with Streamhead Pocosin vegetation, and longleaf pine (*Pinus palustris*) and various scrub oaks dominating the uplands. In the southern half, much of the canopy has been thinned in previous decades, such that the pines often are scattered and crowns do not touch. One ridge has a very dense and diverse herb layer that seems to slow the growth of oaks. Besides the abundant wiregrass (*Aristida stricta*), also common is the Watch List lupine scurfpea (*Orbexilum lupinellum*). Notable on the ridge is a considerable amount of narrow-leaf pink (*Sabatia brachiata*), which typically grows in disturbed areas or woodland borders, not in high-quality sandhills. One swale nearby contains a great array of species, including the Significantly Rare showy milkwort (*Polygala grandiflora*) and soft milk-pea (*Galactia mollis*), and the Watch List eastern prairie-clover (*Dalea pinnata*).

A large man-made pond lies along the southeastern boundary of the natural area. Canby’s bulrush (*Schoenoplectus etuberculatus*), southern white beaksedge (*Rhynchospora macra*), and Robbins’s spikerush (*Eleocharis robbinsii*) are rare plants that occur along the pond margin.

North of a sand road that bisects the site, the significant features are the upper ends of the tributaries of Little Muddy Creek, plus upland swales that occasionally hold water (marginal examples of Vernal Pools). Along the margins of the streams is a Wet Pine Flatwoods. Notable plants in this wetland include creeping blueberry (*Vaccinium crassifolium*), zigzag bladderwort (*Utricularia subulata*), yellow-eyed-grass (*Xyris* sp.), and *Sphagnum* moss, amid much wiregrass.

Slight depressions just above the upper end of the tributaries were once flooded by a beaver pond, killing the trees. The waters have since receded, and what remains are pools of water surrounded by dense shrubs – Small Depression Pocosins, which are rare in the sandhills region. Honey-cups (*Zenobia pulverulenta*) is quite common in clumps around these tiny pools that remain. Whether these depressions are actually Vernal Pools is not clear, but the area is frequently burned, and dense pocosin shrubs are present. The former beaver pond (just south of Hills Creek Road) is now being colonized by native shrubs, such as honey-cups, titi (*Cyrilla racemiflora*), and swamp doghobble (*Leucothoe racemosa*). The only known site in the North Carolina sandhills for leatherleaf (*Chamaedaphne calyculata*) is present in this wetland and in the wetland across the north side of Hills Creek (B. Sorrie, pers. comm.), and golden-club (*Orontium aquaticum*) grows in the remaining water.

PROTECTION AND MANAGEMENT: Roughly 95% of the natural area is in conservation ownership in the Sandhills Game Land, owned and managed by the N.C. Wildlife Resources Commission. A small area in the far northwestern corner is part of the Beaver Dam Creek/Little Muddy Creek Registered Natural Heritage Area. Though the man-made pond lies partly on the Game Land, the dam is on private property and thus is not under control of the Commission. Some private lands are included in this site, mainly in the narrow floodplain of Hills Creek, which forms the southern boundary, and a wedge of private land between the Game Land and US 15-501.

The Commission should continue to manage the land for game species of wildlife and for the red-cockaded woodpecker. A few food plots are present embedded in the natural area, though they are not intrusive. However, new food plot fields should not be created. Prescribed burns should continue.

NATURAL COMMUNITIES: Pine/Scrub Oak Sandhill (Mesic Transition and Mixed Oak variants), Streamhead Pocosin, Wet Pine Flatwoods, Vernal Pool, Small Depression Pocosin

RARE PLANTS: sandhills milk-vetch (*Astragalus michauxii*), bog oatgrass (*Danthonia epilis*), Robbins's spikerush (*Eleocharis robbinsii*), sandhills gaillardia (*Gaillardia aestivalis*), soft milk-pea (*Galactia mollis*), showy milkwort (*Polygala grandiflora*), southern white beaksedge (*Rhynchospora macra*), sandhills wild-petunia (*Ruellia ciliosa*), Canby's bulrush (*Schoenoplectus etuberculatus*), chaffseed (*Schwalbea americana*) (historic occurrence); Watch List – eastern prairie-clover (*Dalea pinnata*), lupine scurfpea (*Orbexilum lupinellum*), sweet pitcher-plant (*Sarracenia rubra*), purple pitcher-plant (*Sarracenia purpurea*)

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*), pinewoods darter (*Etheostoma mariae*), red-cockaded woodpecker (*Picoides borealis*)

REFERENCES:

- LeGrand, H. 2003a. Site report: Sandhills Game Land – Block D (southern portion). N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2003b. Site report: Sandhills Game Land – Block D (southwestern portion). N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

WATERY BRANCH SANDHILLS

Site Number: 8

Size: 902 acres

Site Significance: State

Quadrangle: Silver Hill

Ownership: N.C. Wildlife Resources Commission (95%),
private (5%)

SIGNIFICANT FEATURES: The southwestern half of the natural area has a good and rather rare example of Vernal Pool, which has one of the state's largest populations of a rare plant species – water dawnflower (*Stylisma aquatica*). The extent of mesic flats in this section is also impressive. The northeastern half has more typical topography and vegetation, though one portion also has an extensive mesic flat.

LANDSCAPE RELATIONSHIPS: The isolated Horseshoe Road Sandhills (i.e., Sandhills Game Land Block G) lies roughly 3/4-mile to the east. Portions of Sandhills Game Land Block D lie about 1.0 to 1.2 to the north; these are within the Upper Hills Creek Sandhills and Hills Creek Road Sandhills sites respectively. The mostly privately-owned Aberdeen Road Sandhills lies about 0.4 mile to the west, on the west side of Aberdeen Road (US 15-501).

SITE DESCRIPTION: Most of the natural area is an unusually flat region of sandhills. The section southwest of SR 1332 (Peach Orchard Road) has no flowing water, such as streams. A very small area near the southern corner is a Vernal Pool natural community. It contains hardly any trees or shrubs; instead, the shallow depression is carpeted in various grasses and forbs, such as switchcane (*Panicum virgatum*), white-bract thoroughwort (*Eupatorium leucolepis*), white meadow-beauty (*Rhexia mariana* var. *exalbida*), and water dawnflower (*Stylisma aquatica*). The eastern portion (south of SR 1332) contains mesic soils with a Pine/Scrub Oak Sandhill (Mesic Transition variant) community. Rare species such as sandhills milk-vetch (*Astragalus michauxii*) and soft milk-pea (*Galactia mollis*) have been found on this half of the block.

As with the southwestern half of Block F, the northeastern portion (north of SR 1332) is a reasonably flat section of the game land. Though the flattest areas are primarily Pine/Scrub Oak Sandhill (Mixed Oak variant), the western and northern portion of the uplands are essentially a Xeric Sandhill Scrub natural community. Turkey oak (*Quercus laevis*) is the predominant understory tree in the latter community. Watery Branch flows eastward and forms the northern boundary, and it has two forks in the northern and western part of the block. Thus, there is some slope to the landscape near these streams. Along and adjacent to the stream and the forks is a Streamhead Pocosin community. The canopy is composed of pond pine (*Pinus serotina*), red maple (*Acer rubrum*), and some swamp tupelo (*Nyssa biflora*). Most of the typical pocosin species are present in the shrub and understory layers, including the uncommon coastal witch-alder (*Fothergilla gardenii*). Large stands of the Watch List nestronia (*Nestronia umbellula*)

extend from the edge of the community upwards into the Xeric Sandhill Scrub community; this shrub is generally rare in the sandhills, and this is one of the largest populations in the state.

A number of rare animals have been found at this block. Most significant is one of the few recorded Game Land sites for the State Significantly Rare frosted elfin (*Callophrys irus*) butterfly, whose host plant is sandhills lupine (*Lupinus diffusus*).

PROTECTION AND MANAGEMENT: This site is owned and managed by the N.C. Wildlife Resources Commission, as part of the Sandhills Game Land. It is burned on a several-year cycle to manage for wildlife values and for habitat maintenance of the Federally listed red-cockaded woodpecker (*Picoides borealis*). Current management guidelines and activities seem to be adequate to good and should be continued. Because the vegetation alongside Watery Branch is in good condition, the site boundary includes a small amount of private land – about 5% of the entire natural area – on the north side of the creek, and on the south side of the creek just east of the Game Land.

NATURAL COMMUNITIES: Vernal Pool, Streamhead Pocosin, Pine/Scrub Oak Sandhill (Mesic Transition and Mixed Oak variants), Xeric Sandhill Scrub

RARE PLANTS: sandhills milk-vetch (*Astragalus michauxii*), soft milk-pea (*Galactia mollis*), water dawnflower (*Stylisma aquatica*), Carolina triodia (*Tridens carolinianus*); Watch List – nestronia (*Nestronia umbellula*)

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*), frosted elfin (*Callophrys irus*), Meske's skipper (*Hesperia meskei*), southern hognose snake (*Heterodon simus*), red-cockaded woodpecker (*Picoides borealis*); Watch List – eastern fox squirrel (*Sciurus niger*)

REFERENCES:

- LeGrand, H. 2003a. Site report: Sandhills Game Land – Block F (southwest portion). N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2003b. Site report: Sandhills Game Land – Block F (northeast portion). N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

NAOMI CHURCH SANDHILLS

Site Number: 9

Size: 576 acres

Site Significance: Regional

Quadrangles: Pinebluff, Silver Hill

Ownership: N.C. Wildlife Resources Commission (35%),
multiple private (65%)

SIGNIFICANT FEATURES: The natural area contains several depressions filled with wetland shrub species, most likely Small Depression Pocosins, rare in the sandhills. The area contains one of the larger populations of the Federal and State Endangered Michaux's sumac (*Rhus michauxii*).

LANDSCAPE RELATIONSHIPS: This site abuts the Beaver Dam Creek/Little Muddy Creek Natural Area (in the Sandhills Game Land) on the west. Drowning Creek/Quewhiffle Creek Floodplain (essentially all in private ownership) lies immediately to the north. Roughly 35% of Naomi Church Sandhills is part of the Sandhills Game Land, though this part of the Game Land had not already been identified by NC NHP as a standard natural area.

SITE DESCRIPTION: This area of sandhills vegetation lies at the extreme northeastern edge of the Sandhills Game Land Block D. The site also includes the northern portion of Sandhills Game Land Block H, a disjunct piece of land split by Hills Creek Road. This part of Block H contains fire-suppressed sandhills, with the typical vegetation of longleaf pine (*Pinus palustris*) over a subcanopy of turkey oak (*Quercus laevis*) and bluejack oak (*Q. incana*), among others. However, the lack of recent fire has allowed loblolly pines (*P. taeda*) and southern red oaks (*Q. falcata*) to join the canopy. Northwest of the Game Land is a very flat area with slight depressions that hold water. Loblolly pines mainly form the canopy, but a dense pocosin shrub layer is present, including inkberry (*Ilex glabra*) and shining fetterbush (*Lyonia lucida*), along with highbush blueberry (*Vaccinium fuscatum*) in the wettest places. Though these might be fire-suppressed Vernal Pools, they at least now represent Small Depression Pocosins. Surrounding the pocosins is a marginal example of Wet Pine Flatwoods; patches of creeping blueberry (*Vaccinium crassifolium*) are common here.

The western portion contains a gentle swale that straddles the Game Land and private land. A rather large population of the Federal and State Endangered Michaux's sumac (*Rhus michauxii*) is present, with most being on private land in an abandoned field. The swale has an abundance of poison-oak (*Toxicodendron pubescens*), plus the infrequent (in the sandhills) New Jersey tea (*Ceanothus americana*). Farther north, mainly on the Game Land, is a fire-suppressed Wet Pine Flatwoods and possibly Mesic Pine Flatwoods. This flatwoods lies in the outer, non-flooded portion of the Drowning Creek floodplain. The Federal and State Endangered red-cockaded woodpecker (*Picoides borealis*) formerly inhabited this flatwoods, but it has disappeared, likely owing to fire suppression.

PROTECTION AND MANAGEMENT: The Sandhills Game Land portion, though in conservation ownership, has no special protection such as Registry. The remaining lands are in multiple private ownership. Acquisition of several tracts, at least those containing the wet depressions and the Michaux's sumac, is warranted, adding them to the Sandhills Game Land. Conservation agencies should work with the owner of the bulk of the sumac population to make sure that it is being well-managed/protected.

Most of the natural area greatly needs prescribed burns. These burns need to occur at least every 5 years, if not every 3 years. Fires could open up the wet depressions to a host of wetland herb species. Fire, or thinning of saplings, is needed every few years in the abandoned field to maintain the rare sumac population, which will decline as trees overtake the sumacs and begin providing dense amounts of shade.

NATURAL COMMUNITIES: Small Depression Pocosin, Wet Pine Flatwoods

RARE PLANTS: Michaux's sumac (*Rhus michauxii*)

RARE ANIMALS: red-cockaded woodpecker (*Picoides borealis*)

REFERENCES:

- LeGrand, H. 2003. Site report: Naomi Church Sandhills. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2004. Site report: Naomi Church Sandhills – Visit II. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

HILLS CREEK ROAD SANDHILLS

Site Number: 10

Size: 404 acres

Site Significance: County

Quadrangle: Silver Hill

Ownership: N.C. Wildlife Resources Commission (45%),
private (55%)

SIGNIFICANT FEATURES: The natural area contains a variety of sandhills habitats in a small area, even though bisected by a paved public road. Typical upland sandhills is present, but of more significance is a flatwoods area at the upper end of the Drowning Creek swamp, as well as pocosin vegetation containing much Atlantic white-cedar (*Chamaecyparis thyoides*) along Hills Creek. Several rare plants and animals are known from the site.

LANDSCAPE RELATIONSHIPS: The site includes the western “upland” portion of the existing NC NHP site known as the Lumber River/Drowning Creek Flatwoods and Swamp. (This inventory still retains the latter site name, but that area is now strictly the swamp/pocosin wetlands in the floodplain and not the longleaf pine portions, mainly uplands, that have been shifted to the Hills Creek Road Sandhills site.) Less than 0.5 mile to the north is the southern end of the Naomi Church Sandhills. Slightly more than a mile to the south is the Watery Branch Sandhills (essentially Sandhills Game Land Block F).

SITE DESCRIPTION: The forest alongside both the east and west sides of Hills Creek Road (SR 1400) is a well-maintained (by prescribed burning) longleaf pine (*Pinus palustris*) stand. West of the road, the southern portion is mainly a Xeric Sandhill Scrub community, whereas farther north toward Hills Creek it is a Pine/Scrub Oak Sandhill (Mixed Oak variant). Scrub post oak (*Quercus margaretta*), bluejack oak (*Q. incana*), and blackjack oak (*Q. marilandica*) are well represented. A Streamhead Pocosin community lines Hills Creek, and a moderate amount of Atlantic white-cedar (*Chamaecyparis thyoides*) is present. Of interest is a small area of Wet Pine Flatwoods adjacent to the pocosin, where locally uncommon plants such as pyxie-moss (*Pyxidanthra barbulata*) and the Watch List Carolina asphodel (*Tofieldia glabra*) are found, and sheep-kill (*Kalmia carolina*) is quite common.

East of the road is additional typical sandhills, though there is a dry depression in this area. This Pine/Scrub Oak Sandhill (Mixed Oak variant) has a diverse herb layer, and several stands of the Watch List eastern prairie-clover (*Dalea pinnata*) are present. Of more interest is the gradual downslope to the Drowning Creek floodplain, and at the base of the slope is a narrow zone of Wet Pine Flatwoods. This community in the Sandhills region is characterized by, as noted here, dense zones of creeping blueberry (*Vaccinium crassifolium*) and pyxie-moss, with dense stands of sheep-kill along the wetter and shrubbier ecotone. This ecotone has a few individuals of the State Significantly Rare white wicky (*Kalmia cuneata*).

A number of rare animals are found in the area. Several clusters of the Federal and State Endangered red-cockaded woodpecker (*Picoides borealis*) are known from the site, though it is not known if the birds are still breeding at the site. The State Special Concern and Federal Species of Concern southern hognose snake (*Heterodon simus*) is known from the vicinity, and the State Significantly Rare frosted elfin (*Callophrys irus*) butterfly uses the sandhills lupine (*Lupinus diffusus*) at the site for its host plant. The pinewoods darter (*Etheostoma mariae*) and the sandhills chub (*Semotilus lumbee*), both State Special Concern, have been found in Hills Creek.

PROTECTION AND MANAGEMENT: The Sandhills Game Land portion, roughly 45% of the natural area, is in conservation ownership; a portion of this public land has additional protection as the Lumber River/Drowning Creek Flatwoods and Swamp Registered Natural Heritage Area. Most of the remaining land, on both sides of the road, is in a single private ownership. A second tract, to the west, is enrolled in the Safe Harbor Program. Conservation agencies should work with these landowners for additional protection, such as conservation easements, if acquisition is not a suitable option.

The natural area is being managed fairly well by private landowners, though the State-owned land is not as well managed by prescribed burns. A portion of the Game Land at the southern end of the site is a pine straw raking zone, and thus there are impacts to the herb layer. It is hoped that no additional lands at the site will be opened up to pine straw raking/harvest.

NATURAL COMMUNITIES: Wet Pine Flatwoods, Streamhead Pocosin, Pine/Scrub Oak Sandhill (Mixed Oak variant), Xeric Sandhill Scrub

RARE PLANTS: white wicky (*Kalmia cuneata*); Watch List – eastern prairie-clover (*Dalea pinnata*), Carolina asphodel (*Tofieldia glabra*)

RARE ANIMALS: frosted elfin (*Callophrys irus*), pinewoods darter (*Etheostoma mariae*), southern hognose snake (*Heterodon simus*), red-cockaded woodpecker (*Picoides borealis*), sandhills chub (*Semotilus lumbee*); Watch List – eastern fox squirrel (*Sciurus niger*)

REFERENCES:

LeGrand, H. 2003. Site report: Hills Creek Road Sandhills. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

HORSESHOE ROAD SANDHILLS

Site Number: 11

Size: 259 acres

Site Significance: County

Quadrangle: Silver Hill

Ownership: N.C. Wildlife Resources Commission

SIGNIFICANT FEATURES: Both Pond Pine Woodland and Wet Pine Flatwoods are present at this site; each is relatively scarce in the county. The natural area contains large patches of the locally scarce pyxie-moss (*Pyxidanthra barbulata*). In addition, it contains tree clubmoss (*Lycopodium obscurum*); this primarily montane and Piedmontane species is rare in the sandhills. A small population of the State Significantly Rare white wicky (*Kalmia cuneata*) has been reported from the natural area.

LANDSCAPE RELATIONSHIPS: The Lumber River/Chalk Banks Flatwoods and Pocosins natural area abuts this site on the east. The Wagram Borrow Pit Amphibian Site lies only 1/4-mile west of the southern end of the natural area. The Watery Branch Sandhills (e.g., Sandhills Game Land Block F) lies roughly 3/4-mile west of the natural area.

SITE DESCRIPTION: The Horseshoe Road Sandhills is the sitename given here for Block G of the Sandhills Game Land, which is split in half by Horseshoe Road (SR 1413). Essentially all of the block is included in this natural area, minus a pine straw sale area. The northern half is the more significant part, as it contains a mix of sandhills vegetation and pocosin vegetation. The site lies at the eastern edge of the Sandhills region, and the pocosin vegetation is actually best considered the outer edge of the Lumber River floodplain. Thus, instead of Streamhead Pocosin natural community, most of the pocosins are small examples of Pond Pine Woodlands. Also, embedded between the pocosins and upland sandhills are several decent but small examples of Wet Pine Flatwoods, scarce in most of the Sandhills Game Land as well. Some of the sandhills are raked, however, and the site does contain three food plots/weedy fields.

The primary natural community in size is Pine/Scrub Oak Sandhill (Mixed Oak variant). Longleaf pine (*Pinus palustris*) is the primary canopy species. The understory features the four scrub oak species – turkey oak (*Quercus laevis*), bluejack oak (*Q. incana*), scrub post oak (*Q. margaretta*), and blackjack oak (*Q. marilandica*) – with few other species. In some areas, the longleaf pines have been thinned or removed, such that in many places there is no closed canopy. There has been no fire in the tract for a decade or more, such that the oaks typically are very dense. The shrub and herb zones are poor.

The Pond Pine Woodland community north of the road is rather small, and it arguably could be considered a broad ecotone of a Streamhead Pocosin. Pond pine (*Pinus serotina*) is the main canopy tree. A great variety of shrubs are present, with sweet pepperbush (*Clethra alnifolia*) being abundant along the margin of the pocosin. Along the margins of the pocosin grow some

notable species such as tree clubmoss (*Lycopodium obscurum*). South of the road, the Game Land tract barely includes the western edge of pocosin vegetation in the floodplain, and a small population of the State Significantly Rare white wicky (*Kalmia cuneata*) has been reported along the pocosin/upland ecotone, though it could not be re-located during this inventory.

Several places at the edge of the Pond Pine Woodlands are dominated by longleaf pine but have a low cover of bracken fern (*Pteridium aquilinum*), small black blueberry (*Vaccinium tenellum*), creeping blueberry (*V. crassifolium*), and other species. These are Wet Pine Flatwoods, which are scarce in the Sandhills Game Land. There are several areas of about an acre each. Characteristic herbs in this community are pyxie-moss (*Pyxidanthra barbulata*), tall meadow-beauty (*Rhexia alifanus*), yellow-eyed-grasses (*Xyris* spp.), and bog-buttons (*Lachnocaulon anceps*).

PROTECTION AND MANAGEMENT: The natural area is owned and managed by the N.C. Wildlife Resources Commission as the Sandhills Game Land Block G. As this section of the Game Land is fragmented from larger, more centrally located blocks, it receives less management attention, and most is quite fire-suppressed. Fire is needed on a 3-5-year basis to maintain the natural communities. In the northern portion, the block contains a large area used as a pine straw harvest area, in addition to several small food plots. Sadly, a formerly decent stand of longleaf pine sandhills to the southwest of the block was clearcut a few years ago, and loblolly pines (*P. taeda*) have dominated the regenerating clearcut.

NATURAL COMMUNITIES: Pond Pine Woodland, Wet Pine Flatwoods, Pine/Scrub Oak Sandhill (Mixed Oak variant)

RARE PLANTS: white wicky (*Kalmia cuneata*)

RARE ANIMALS: None known

REFERENCES:

LeGrand, H. 2003. Site report: Sandhills Game Land – Block G (north portion). N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

WAGRAM BORROW PIT AMPHIBIAN SITE

Site Number: 12

Size: 4.5 acres

Site Significance: Regional

Quadrangle: Silver Hill

Ownership: N.C. Department of Transportation

SIGNIFICANT FEATURES: This man-made pond provides habitat for six species of rare animals – five amphibians and one reptile. Few other sites in the state have as many rare herps as this.

LANDSCAPE RELATIONSHIPS: The southern end of Horseshoe Road Sandhills (i.e., Sandhills Game Land Block G) lies about 1/4-mile east of the pond, whereas the southeastern edge of Watery Branch Sandhills (i.e., Sandhills Game Land Block F) lies about 1 mile from the site. A tract owned by the N.C. Herpetological Society, known as Big Shoe Heel Creek Preserve, lies about 0.4 mile to the southwest.

SITE DESCRIPTION: The site, which is not a natural area, is a man-made borrow pit that contains some water all year. In a wet year, approximately one-half to two-thirds of the area is covered with water during the winter and spring seasons. It lies in a tight triangle of roads, which are scarcely 100 yards from the water. There is very little upland habitat, therefore, at least within the triangle, and nearly all of the sandhills have been clearcut in recent years.

Despite the artificial nature of the pond, and poor quality of the surrounding habitat, biologists at the N.C. Museum of Natural Sciences have documented at least 24 species of amphibians – 19 frogs and 5 salamanders, plus a few turtles, at the borrow pit. Rare species present in the borrow pit are the State Threatened and Federal Species of Concern Carolina gopher frog (*Rana capito*), State Threatened eastern tiger salamander (*Ambystoma tigrinum*), and four State Significantly Rare species – Mabee's salamander (*Ambystoma mabeei*), oak toad (*Bufo quercicus*), ornate chorus frog (*Pseudacris ornata*), and chicken turtle (*Deirochelys reticularia*). The site has been studied by Museum staff since the mid-1960's.

PROTECTION AND MANAGEMENT: This site, important because it has permanent water nearly all year long and an absence of fish and other predators that can eat larvae and adults, was purchased a few years ago by the N.C. Department of Transportation (NC DOT) for wetland mitigation purposes. This acquisition came about at the urging of Museum staff, who learned that the previous owner was considering disposing of tree debris in the pond for future mining of peat. Though owned by NC DOT, it is considered to be in conservation ownership, as it is a mitigation site. Museum staff and N.C. Herpetological Society members monitor the site, though there is no formal management agreement among parties.

Management of the site is likely difficult. Keeping water levels adequate is at the mercy of rainfall and other factors out of control of various agencies involved, as the level is due to the rise and fall of the water table and not to surface water flow into or out of the pond. It is important that sediment and other material not wash into the pond from utility construction along rights-of-ways next to roads. Release of fish into the pond, for purposes of fishing, would be highly detrimental to the herp populations. Vegetation management may be needed. Illegal collecting of herps from ponds/pools is always a concern, especially one so close to public roads. The area is fenced and signs are posted by the NC DOT. Formal management agreements may well be needed between NC DOT and the Museum (and/or the Herpetological Society) in the near future regarding management, enforcement, and other matters.

NATURAL COMMUNITIES: None

RARE PLANTS: None known

RARE ANIMALS: Mabee's salamander (*Ambystoma mabeei*), eastern tiger salamander (*Ambystoma tigrinum*), oak toad (*Bufo quercicus*), chicken turtle (*Deirochelys reticularia*), ornate chorus frog (*Pseudacris ornata*), Carolina gopher frog (*Rana capito*)

REFERENCES:

Braswell, A. 1995. Letter to NC DOT, dated 19 October 1995, concerning "Potential wetlands mitigation site in Scotland County for DOT consideration".

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

UPPER LUMBER RIVER CLUSTER

Site Number: D

Site Significance: State

Ownership: N.C. Wildlife Resources Commission,
N.C. Division of Parks and Recreation, private

Quadrangles: Pinebluff, Silver Hill,
Wagram, Wakulla

SIGNIFICANT FEATURES: The Upper Lumber River Cluster includes not only the Lumber River (and Drowning Creek), but the lower floodplain terrace and the upper terrace, as well. The lower terrace is mostly covered in Cypress-Gum Swamp forest, but there is considerable Coastal Plain Bottomland Hardwoods (Blackwater subtype) as well; the latter is uncommon in the state, and some of the largest amounts of this community are found in this cluster. Farther back in the upper portions, on the upper terrace (which seldom floods), are Pond Pine Woodland and a small amount of Peatland Atlantic White Cedar Forest communities. These are rarely seen away from the lower Coastal Plain, but a large amount – hundreds of acres – of Pond Pine Woodland are present, both upstream of Turnpike Road and especially between that road and US 401. Also present on the upper terrace, primarily south of Turnpike Road, are Wet Pine Flatwoods and a few small examples of High Pocosin, of uncertain origin and characterization. A few xeric, fluvial ridges are embedded in this upper portion, and these contain remnant sandhills vegetation. The lower half of the river floodplain (below US 401) consists of a very narrow floodplain, with a mix of Cypress-Gum Swamp and Bottomland Hardwoods.

LANDSCAPE RELATIONSHIPS: The Scotland County Sandhills – Northeastern Cluster lies along the western boundary of the Upper Lumber River Cluster southward past Turnpike Road. Farther to the south, the cluster does not border other clusters or stand-alone sites, though it comes within ½-mile of the Shoe Heel Creek Sand Ridge. Upstream of the cluster, along the Drowning Creek floodplain, it abuts the Scotland County Sandhills – Northwestern Cluster.

SITE DESCRIPTION: This is a very long and linear cluster extending upstream to US 15-501 -- an artificial break at a highway and at Camp Mackall farther upstream – and downstream into Robeson County, to at least Maxton Pond. This site is thus at least 25 river-miles in length. It reaches maximum width in the Chalk Banks area north of US 401, at roughly 2 miles wide, east-west. Drowning Creek flows southeastward past Moore and Richmond counties, and it is renamed the Lumber River where Watery Branch enters it, just south of SR 1412 (Turnpike Road). The river (and Drowning Creek) forms the eastern boundary of Scotland County, separating it from Hoke County to the east. The upper portions of the cluster feature a fairly wide floodplain forest (on the Scotland County side).

This cluster contains the following standard sites (arranged from upstream to downstream), previously identified by NC NHP; their significance rank is also listed [SGL = Sandhills Game Land]:

Quewhiffle Creek Confluence Natural Area (Regional): This natural area has now been included in the larger Drowning Creek/Quewhiffle Creek Floodplain (Site 13), and is described later in this report.

Lumber River/Little Creek Confluence (Regional): This site is also included within Site 13 in this report.

Lumber River/Drowning Creek Flatwoods and Swamp (SGL) (Regional): This site is now Site 14 in the report. Additional Sandhills Game Land south of Turnpike Road, not previously part of an NC NHP identified site, has been added to Site 14.

Chalk Banks (Regional): This old site has been split, with the inner portion being part of the very large Lumber River/Chalk Banks Flatwoods and Pocosins (Site 15), and the riverine portion being included in the very long Upper Lumber River Swamp (Site 16).

Spring Branch Church Swamp (Regional): This site is now part of the much larger Upper Lumber River Swamp (Site 16).

Maxton Airport Swamp (Regional): This site is also now part of the much larger Upper Lumber River Swamp (Site 16).

REFERENCES:

- North Carolina Natural Heritage Program. 2003. N.C. Natural Heritage Program Biennial Protection Plan: List of Significant Natural Heritage Areas, 2003. Office of Conservation and Community Affairs, DENR, Raleigh.
- Sorrie, B.A. 1998. Survey for Rare and Endangered Plants on 30,000 Acres of Sandhills Game Land, North Carolina. Report to N.C. Wildlife Resources Commission.
- The Nature Conservancy and N.C. Natural Heritage Program. 1994. Survey for Rare and Endangered Plants on 25,000 Acres of Sandhills Game Land, North Carolina. North Carolina Chapter of The Nature Conservancy, Carrboro, NC; and North Carolina Natural Heritage Program, Division of Parks and Recreation, DENR, Raleigh, NC.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

DROWNING CREEK/QUEWHIFFLE CREEK FLOODPLAIN

Site Number: 13

Site Significance: Regional

Ownership: multiple private

Size: 1,297 acres (includes Hoke County)

Quadrangles: Pinebluff, Silver Hill

SIGNIFICANT FEATURES: The site contains a high quality example of Coastal Plain Bottomland Hardwoods (Blackwater subtype), a relatively scarce subtype in the state and often not found far any distance from a river. An example of Pond Pine Woodland is also present, as is the common Cypress-Gum Swamp (Blackwater subtype) community.

LANDSCAPE RELATIONSHIPS: The natural area is nearly surrounded by other natural areas. On the west, opposite US 15-501, is the Camp Mackall Drowning Creek Natural Area, basically an extension of this natural area westward up the Drowning Creek floodplain. It abuts the Beaver Dam Creek/Little Muddy Creek Natural Area (in the Sandhills Game Land) on the south. Also contiguous on the south is Naomi Church Sandhills (includes part of the Sandhills Game Land). At the downstream end of the natural area, it touches the Lumber River/Drowning Creek Flatwoods and Swamp (Sandhills Game Land). Across Drowning Creek into Hoke County, this natural area has a long contiguous boundary with the privately-owned McFarland Sandhills.

SITE DESCRIPTION: The Drowning Creek floodplain has an average width of about ½-mile on the Scotland County side. Most of the floodplain is Coastal Plain Bottomland Hardwoods (Blackwater subtype). The dominant tree is red maple (*Acer rubrum*), though some portions contain considerable laurel oak (*Quercus laurifolia*). Other canopy trees include tuliptree (*Liriodendron tulipifera*), swamp tupelo (*Nyssa biflora*), sweetgum (*Liquidambar styraciflua*), and pond-cypress (*Taxodium ascendens*). Atlantic white-cedar (*Chamaecyparis thyoides*) is scattered and does not form stands; and some pond pine (*Pinus serotina*) and loblolly pine (*P. taeda*) are also present. The understory is represented by broadleaf evergreens such as American holly (*Ilex opaca*), redbay (*Persea palustris*), and sweetbay magnolia (*Magnolia virginiana*). The shrub layer is very dense and “pocosin-like”. Titi (*Cyrilla racemiflora*), big gallberry (*Ilex coriacea*), and shining fetterbush (*Lyonia lucida*) are common, as is bamboo-vine (*Smilax laurifolia*). Some cane (*Arundinaria gigantea*) is present locally. At the drier end of the floodplain, dense stands of coastal doghobble (*Leucothoe axillaris*) are common. Ferns such as cinnamon fern (*Osmunda cinnamomea*) are common in openings.

Farther to the southeast, Pond Pine Woodland dominates. Pond pine is the main canopy species, though red maple likely is succeeding it in the absence of fire. Otherwise, the understory and shrub layers are about as above. However, honey-cups (*Zenobia pulverulenta*) is locally common along the wetter ecotones. Sheep-kill (*Kalmia carolina*) is locally numerous in ecotones, and there is a good diversity of shrubs along the ecotone. The vegetation immediately

along Drowning Creek is not an obvious swamp, and herbaceous species are present in this part of the floodplain. However, this forest does contain a good population of the State Significantly Rare sarvis holly (*Ilex amelanchier*), which is found typically along the banks of the creek. Thus, the community along the creek itself is considered as a marginal example of a Cypress-Gum Swamp.

PROTECTION AND MANAGEMENT: There appears to be no protection of any part of the natural area, other than a portion on the Hoke County side being enrolled in the Safe Harbor Program (which is designed to protect the red-cockaded woodpecker [*Picoides borealis*] on the adjacent uplands). This lack of protection is in stark contrast to an abundance of public land (mainly Sandhills Game Land and Camp Mackall) bordering nearly all of the west and south sides. The natural area is composed of several privately owned tracts.

In general, the natural area needs no special management. Logging, at least clearcutting, should not be done. It is unfortunate that the northeastern quadrant of the floodplain (east of US 15-501 and north of the creek) was completely clearcut a few years ago. The natural area includes a few man-made ponds, perhaps borrow pits, adjacent to the Game Land; these are included within the site boundary because there appear to be no other impacts to the surrounding forests, and because such man-made ponds can be important to breeding frogs and salamanders (some of which may be rare species).

Because of the great concern about future clearcutting, it is very important for this scenic natural area to be protected, especially because much can be seen from US 15-501. And, as Sandhills Game Land lies to the south, it would seem that the N.C. Wildlife Resources Commission would be the lead conservation agency to assure protection. The U.S. Department of Defense has been adding lands in the region to expand Camp Mackall, though this floodplain might be unsuitable for training and thus might be a low priority for military acquisition.

NATURAL COMMUNITIES: Coastal Plain Bottomland Hardwoods (Blackwater subtype), Cypress-Gum Swamp (Blackwater subtype), Pond Pine Woodland

RARE PLANTS: sarvis holly (*Ilex amelanchier*)

RARE ANIMALS: Watch List – Swainson's warbler (*Limnothlypis swainsonii*)

REFERENCES:

- Ash, A.N. 1992. A Preliminary Natural Areas Inventory of the Lumber River Floodplain. Year II - 1991. Report to N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2004. Site report: Drowning Creek/Quewhiffle Creek Floodplain. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

LUMBER RIVER/DROWNING CREEK FLATWOODS AND SWAMP

Site Number: 14

Size: 930 acres (includes Hoke County)

Site Significance: Regional

Quadrangles: Silver Hill, Wagram

Ownership: N.C. Wildlife Resources Commission (95%)
(Scotland County), private (5%) (Hoke County)

SIGNIFICANT FEATURES: The natural area lies on an unusually wide section of floodplain of Drowning Creek, and though technically within the Sandhills region, it contains natural communities – mainly Pond Pine Woodland and Wet Pine Flatwoods – more typical of the lower Coastal Plain. There is also a marginal Peatland Atlantic White Cedar Forest natural community, also limited mainly to broad flatlands in the lower Coastal Plain. Rare species known from the natural area are the Federally Endangered red-cockaded woodpecker (*Picoides borealis*), the State Significantly Rare pine barrens treefrog (*Hyla andersonii*), and the Significantly Rare sarvis holly (*Ilex amelanchier*).

LANDSCAPE RELATIONSHIPS: This natural area lies immediately adjacent to a number of other sites, such that creating meaningful boundaries to distinguish each is difficult. The immediate floodplain (Lumber River) south of Watery Branch is herein called the Upper Lumber River Swamp. The inner, drier part of the Lumber River floodplain south of Watery Branch, and west of Upper Lumber River Swamp, is called the Lumber River/Chalk Banks Flatwoods and Pocosins. The uplands to the west of this natural area are the Hills Creek Road Sandhills. The Drowning Creek floodplain upstream is here called the Drowning Creek/Quewhiffle Creek Floodplain, which also incorporates the NC NHP's former Lumber River/Little Creek Confluence natural area.

SITE DESCRIPTION: This is a remarkably flat area on the western side of the Drowning Creek floodplain, bisected by Turnpike Road (SR 1412). Though the area lies within the greater Sandhills region, in some ways it represents a “finger” of Southern Inner Coastal Plain flatlands extending northward. The western edge of the site is clearly Sandhills region uplands. Unlike most floodplains in Scotland County, this portion of the Drowning Creek floodplain consists of peaty soils and pocosin vegetation, more typical of lower Coastal Plain sites such as in Croatan National Forest or Holly Shelter Game Land. Thus, the natural communities are the broader, flat “peatland” types rather than the narrower, sloping “streamhead” types.

The dominant natural communities northwest of the road are Pond Pine Woodland and Wet Pine Flatwoods, both scarce in the upper half of the Coastal Plain. The former is the dominant community, especially in the western half. Pond pine (*Pinus serotina*) is the dominant canopy tree, with some red maple (*Acer rubrum*) also present. The dense understory shrub layer is dominated by shining fetterbush (*Lyonia lucida*), along with titi (*Cyrilla racemiflora*), redbay (*Persea palustris*), and sweetbay magnolia (*Magnolia virginiana*). Bamboo-vine (*Smilax*

laurifolia) is very abundant. More open spots, possibly in artificial clearings, have dense stands of honey-cups (*Zenobia pulverulenta*).

Wet Pine Flatwoods are present on slightly higher ground in the floodplain. The nearly closed canopy is primarily composed of longleaf pine (*P. palustris*), but some pond pine and even a few Atlantic white-cedar (*Chamaecyparis thyoides*) trees are present. Fire suppression has allowed for a locally dense shrub layer; widespread are dangleberry (*Gaylussacia frondosa*), sheep-kill (*Kalmia carolina*), cane (*Arundinaria gigantea*), and creeping blueberry (*Vaccinium crassifolium*). Wiregrass (*Aristida stricta*) and bracken fern (*Pteridium aquilinum*) are the primary herbs.

The White Cedar Forest is small in size and is located close to the creek, behind a Cypress-Gum Swamp (Blackwater subtype). Cedars range in size to over 2-foot trunk diameter. Other trees present include loblolly pine (*P. taeda*), red maple, and sweetbay magnolia. The thick shrub layer is composed mainly of shining fetterbush, titi, inkberry (*Ilex glabra*), and big gallberry (*I. coriacea*). The Cypress-Gum Swamp is narrow in width and fairly young, with trees averaging only 8" in trunk diameter. Swamp tupelo (*Nyssa biflora*) is the dominant canopy tree.

A slight ridge in the center of the floodplain has a surprising Pine/Scrub Oak Sandhill (Mixed Oak variant) community. It is fire-suppressed, and the community is much more widespread in uplands west of the floodplain. However, "islands" of scrub oaks are rarely encountered. All four scrub oak species – turkey (*Quercus laevis*), bluejack (*Q. incana*), scrub post (*Q. margaretta*), and blackjack (*Q. marilandica*) – are present on the ridge.

The portion of the natural area southeast of Turnpike Road is very fire-suppressed. The area closest to the road is a mix of Pine/Scrub Oak Sandhill and Wet Pine Flatwoods. Pocasin wetlands, probably Pond Pine Woodland, occur farther east, extending to Watery Branch and Drowning Creek.

The Federally Endangered red-cockaded woodpecker (*Picoides borealis*) formerly nested in pines in the natural area. The State Significantly Rare pine barrens treefrog (*Hyla andersonii*) is also known from the site, most likely from open, man-made wetlands beneath phone line clearings running alongside Turnpike Road. These "boggy" spots are potential sites for rare plants not seen on the site visit. The Significantly Rare sarvis holly (*Ilex amelanchier*) grows along the margins of Drowning Creek, both east and west of the creek (and north and south of Turnpike Road).

PROTECTION AND MANAGEMENT: All of the natural area on the Scotland County side of Drowning Creek lies within the Sandhills Game Land Block E. The portion lying northwest of Turnpike Road – about 2/3rds of the natural area – has additional protection as a Registered Natural Heritage Area.

Most of the natural area is quite fire-suppressed. However, the forests are very thick at this stage, and burning might be difficult. Nonetheless, it would seem possible to ignite firelines with the fire moving toward either Drowning Creek or Watery Branch. The State Significantly Rare white wicky (*Kalmia cuneata*) grows along the western ecotone of the area (and has been included in the rare species list for Hills Creek Road Sandhills) and would likely benefit from fire.

NATURAL COMMUNITIES: Pond Pine Woodland, Wet Pine Flatwoods, Pine/Scrub Oak Sandhill (Mixed Oak variant), Peatland Atlantic White Cedar Forest, Cypress-Gum Swamp (Blackwater subtype)

RARE PLANTS: sarvis holly (*Ilex amelanchier*)

RARE ANIMALS: pine barrens treefrog (*Hyla andersonii*), red-cockaded woodpecker (*Picoides borealis*)

REFERENCES:

- LeGrand, H. 2004. Site report: Lumber River Floodplain – Turnpike Road (SR 1412) to US 401. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- North Carolina Natural Heritage Program. 1981. Sandhills Game Land Natural Areas. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- Schafale, M. 1989. Site survey report: Lumber River - Drowning Creek Flatwoods, Sandhills Game Land. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- Sorrie, B.A. 1998. Survey for Rare and Endangered Plants on 30,000 Acres of Sandhills Game Land, North Carolina. Report to N.C. Wildlife Resources Commission.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

LUMBER RIVER/CHALK BANKS FLATWOODS AND POCOSINS

Site Number: 15

Size: 2,290 acres

Site Significance: Regional

Quadrangles: Silver Hill, Wagram

Ownership: N.C. Division of Parks and Recreation (10%),
multiple private (90%)

SIGNIFICANT FEATURES: This site contains a very large amount of flatwoods and Pond Pine Woodland communities for a far inland site. These communities are primarily found in the lower Coastal Plain. The area contains a remnant sandhills on a fluvial ridge, adjacent to the Lumber River. Several rare plants and animals are present, including the only known Scotland County record of Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*), a State Endangered and Federal Species of Concern shrub.

LANDSCAPE RELATIONSHIPS: The site is bounded for several miles on the east by the Upper Lumber River Swamp natural area. (The Lumber River/Bear Swamp Aquatic Habitat passes through the swamp; thus, it lies within a few hundred yards of the flatwoods and pocosins.) To the north, across Watery Branch, the natural area is contiguous with the Lumber River/Drowning Creek Flatwoods and Swamp, a Sandhills Game Land site. On the west, the Horseshoe Road Sandhills (also part of the Sandhills Game Land) abuts the natural area for a short distance.

SITE DESCRIPTION: The natural area lies on a broad, flat terrace on the west side of the Lumber River. This is technically not the floodplain of the river, which is part of a separate Lumber River site (the Upper Lumber River Swamp), but a finger of the Southern Inner Coastal Plain extending northward, with the Sandhills region immediately to the west. The natural area consists of extensive Pond Pine Woodland natural community, typically with Wet Pine Flatwoods or possibly Mesic Pine Flatwoods at the upper (western) edge. Embedded within the flats and along the western banks of the Lumber River are a few sandier ridges – old fluvial ridges – that contain Pine/Scrub Oak Sandhill (Mixed Oak variant) natural community. Also, a few small openings within the Pond Pine Woodland appear to represent “High Pocosin”, devoid of trees. Whether these are actually High Pocosin or disturbed Pond Pine Woodland is not apparent.

The dominant community is Pond Pine Woodland. In many areas, the canopy is dominated by mature pond pine (*Pinus serotina*), with Atlantic white-cedar (*Chamaecyparis thyoides*) being locally common. Understory trees such as redbay (*Persea palustris*), sweetbay magnolia (*Magnolia virginiana*), and red maple (*Acer rubrum*) are widespread. The dominant feature of the community is a dense zone of 3-10-foot high shrubs, such as big gallberry (*Ilex coriacea*), shining fetterbush (*Lyonia lucida*), honey-cups (*Zenobia pulverulenta*) in the wetter spots, sheep-kill (*Kalmia carolina*), and many others. There are few herbs. In some areas, this community

has been burned, such that the canopy is slightly open, the understory is reduced, and shrubs are fairly dense.

On slightly higher ground, mainly to the west of the pocosins, is the Wet Pine Flatwoods natural community. The canopy is a mix of pond pine, longleaf pine (*P. palustris*), and some loblolly pine (*P. taeda*). The understory layer is sparse, but there is a dense shrub layer in some areas. However, other places have a dense zone of bracken fern (*Pteridium aquilinum*), with much creeping blueberry (*Vaccinium crassifolium*). Other common shrubs in this zone are dangleberry (*Gaylussacia frondosa*) and sweet pepperbush (*Clethra alnifolia*) along the pocosin/flatwood ecotones. Dwarf azalea (*Rhododendron atlanticum*) and small black blueberry (*Vaccinium tenellum*) are common in the drier transition to Pine/Scrub Oak Sandhill or Mesic Pine Flatwoods. The Significantly Rare King's hairstreak (*Satyrrium kingi*) butterfly occurs in the flatwoods and pocosin margins, near its hostplant [sweetleaf or horse-sugar (*Symplocos tinctoria*)].

The higher areas have mostly thinned Pine/Scrub Oak Sandhill (Mixed Oak variant) that are somewhat fire-suppressed. Loblolly pine and longleaf pine share dominance. All scrub oak species are present – turkey oak (*Quercus laevis*), bluejack oak (*Q. incana*), scrub post oak (*Q. margaretta*), and blackjack oak (*Q. marilandica*) – but are not dense. Openings in the sand ridge near the river in the Chalk Banks part of Lumber River State Park contain fringed bluestar (*Amsonia ciliata*) and Carolina pink (*Silene caroliniana*), both Watch List species; the latter is apparently not known elsewhere in the county.

Small openings of an acre or less are scattered among the Pond Pine Woodland. Here the pocosin shrubs are dense, and sheep-kill is locally numerous, as is honey-cups. These appear to be High Pocosin communities. The State Significantly Rare white wicky (*Kalmia cuneata*) has been found in two sites in the natural area, in this “community”.

PROTECTION AND MANAGEMENT: Only about 10% of the natural area, at the extreme southeastern end, is protected, within the Chalk Banks section of Lumber River State Park. The remainder is under multiple private ownership. As facilities are now being planned for the state park unit, there is a chance that small portions of the natural area could be impacted; however, NC NHP and State Park biologists are working with Park planners to avoid impacting rare species or significant natural communities. Acquisition plans for the State Park call for protection of more land northward along the river. One or two such tracts are quite large and would protect much of the pocosin and flatwood habitats in this natural area. It is hoped that State Parks can expand its acquisition farther inland, or the N.C. Wildlife Resources Commission will expand eastward from Block G (Horseshoe Road Sandhills) or southward from Block E (Lumber River/Drowning Creek Flatwoods and Swamp), to meet the State Park border.

Most of the site is currently managed for selective timber harvest, or for hunting. A number of jeep roads are present, and hunting stands occur over much of the natural area. Within the past few years, the northern tip of the natural area was clearcut; however, a good diversity of wetland

herbs and shrubs is quickly invading the clearcut wetlands. The area is greatly fire-suppressed, and thus herbaceous and even shrub diversity is beginning to suffer. Some burns are needed to increase diversity, both of plants and wildlife.

NATURAL COMMUNITIES: Pond Pine Woodland, Wet Pine Flatwoods, Mesic Pine Flatwoods(?), Pine/Scrub Oak Sandhill (Mixed Oak variant), High Pocosin

RARE PLANTS: Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*), white wicky (*Kalmia cuneata*); Watch List – fringed bluestar (*Amsonia ciliata*), Carolina pink (*Silene caroliniana*)

RARE ANIMALS: King’s hairstreak (*Satyrium kingi*); Watch List – Carolina roadside-skipper (*Amblyscirtes carolina*), southeastern spinyleg (*Dromogomphus armatus*), cobweb skipper (*Hesperia metea*), Swainson’s warbler (*Limnothlypis swainsonii*), eastern fox squirrel (*Sciurus niger*)

REFERENCES:

- LeGrand, H. 2003-04. Site report: Chalk Banks (Lumber River State Park) – Visits I-V. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2004. Site report: Lumber River/Chalk Banks Flatwoods and Pocosins. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

UPPER LUMBER RIVER SWAMP

Site Number: 16

Site Significance: State

Ownership: N.C. Division of Parks and
Recreation (5%), N.C. Wildlife Resources
Commission (<1%), multiple private (95%)

Size: 3,180 acres (includes Hoke County);
about 20 river miles

Quadrangles (in Scotland County):
Wagram, Wakulla

SIGNIFICANT FEATURES: This long site (roughly 20 river miles) contains good examples of characteristic blackwater floodplain communities – Cypress-Gum Swamp and Coastal Plain Bottomland Hardwoods. There are also small examples of Coastal Plain Levee Forest (Blackwater subtype) and Sand and Mud Bar natural communities. The population of the Significantly Rare sarvis holly (*Ilex amelanchier*) scattered along nearly the entire length of the natural area is probably the largest in the state. The State Special Concern river frog (*Rana heckscheri*) had been recorded at several pools and ponds in the floodplain, though it has not been found in North Carolina in recent years.

LANDSCAPE RELATIONSHIPS: The Lumber River/Bear Swamp Aquatic Habitat passes through this natural area. The site abuts Lumber River/Drowning Creek Flatwoods and Swamp at the upper end, with Watery Branch the divide between the two. Also, the Lumber River/Chalk Banks Flatwoods and Pocosins natural area borders this site for many miles on the west (uplands), north of US 401. The Upper Lumber River Swamp natural area extends downstream into Robeson County.

SITE DESCRIPTION: The Lumber River (and its headwaters called Drowning Creek, above Watery Branch) is one of the longest blackwater rivers in North Carolina, and most of its floodplain is still heavily forested. Though NC NHP had previously identified several sections of the river in Scotland and Hoke counties as Regionally significant natural areas – Maxton Airport Swamp and Spring Branch Church Swamp – it seems best to identify the entire floodplain (south of Watery Branch) in Scotland and adjacent Hoke counties as a single State significant natural area. This change is due mainly to the relative lack of change of natural communities and relative lack of disturbances that cause one section of the river floodplain to be “disjunct” from another.

For the most part, the floodplain is rather narrow, averaging 0.3-0.5 mile wide. The surrounding landscape is reasonably flat, and obvious uplands nearby are scarce.

The vegetation closest to the river is mainly Cypress-Gum Swamp (Blackwater subtype). Swamp tupelo (*Nyssa biflora*) is the dominant canopy tree, but stands of pond-cypress (*Taxodium ascendens*) are present. Bald-cypress (*T. distichum*) appears to be absent along the river, at least in this upper portion. Red maple (*Acer rubrum*), laurel oak (*Quercus laurifolia*),

and sweetgum (*Liquidambar styraciflua*) are other numerous trees. Water ash (*Fraxinus caroliniana*) is the main understory tree in this community. Common shrubs include titi (*Cyrilla racemiflora*) and swamp doghobble (*Leucothoe racemosa*). Herbs are scarce, but vines such as poison-ivy (*Toxicodendron radicans*) are common. Along the river are scattered individuals and small clumps of the State Significantly Rare sarvis holly (*Ilex amelanchier*). This is believed to be the most extensive population of the shrub in the state.

Just behind the cypress-gum forest, and in some places reaching the river, is the Coastal Plain Bottomland Hardwoods (Blackwater subtype) community. This community is more prevalent upstream of SR 1412 (in the Lumber River/Drowning Creek Flatwoods and Swamp site). This community is dominated by laurel oak, water oak (*Q. nigra*), loblolly pine (*Pinus taeda*), and a scattering of Atlantic white-cedar (*Chamaecyparis thyoides*). Broadleaf evergreens such as American holly (*Ilex opaca*), redbay (*Persea palustris*), and sweetbay magnolia (*Magnolia virginiana*) are more typical of this community than in the Cypress-Gum Swamp. The shrub and herb layers are more diverse, typically featuring many plants found in pocosins. Ferns such as netted chainfern (*Woodwardia areolata*) are present, as well.

The relatively scarce Coastal Plain Levee Forest (Blackwater subtype) occurs in a few places farther downstream, below US 401; the community is likely not present anywhere else in the county. The ground is only slightly higher adjacent to the river than in the swamp behind it. Typical canopy trees include laurel oak, overcup oak (*Q. lyrata*), loblolly pine, and red maple. A well-developed shrub layer is dominated by mayberry (*Vaccinium elliotii*) and titi, with sweet-spires (*Itea virginica*) and sweet pepperbush (*Clethra alnifolia*) often common.

A few bends of the river between US 401 and the Robeson County line contain the Sand and Mud Bar natural community. River birch (*Betula nigra*) and the locally scarce planertree (*Planera aquatica*) are the main tree species; the latter is not known from elsewhere in the county, this being its farthest location up the river. The bars themselves often feature herbaceous species such as whorled pennywort (*Hydrocotyle verticillata*), false nettle (*Boehmeria cylindrica*), smartweeds (*Polygonum* spp.), and various grasses, sedges, and rushes.

PROTECTION AND MANAGEMENT: The Lumber River passing through this site is designated both a Federal Wild and Scenic River and a State Natural and Scenic River. The N.C. Division of Parks and Recreation has protected roughly 1.5 air miles of the western shoreline of the river above US 401, as the Chalk Banks section of Lumber River State Park. (The bulk of the State Park unit is far downstream in Robeson and Columbus counties.) Though the N.C. Wildlife Resources Commission protects the western side of the Lumber River/Drowning Creek north of Watery Branch, it has only a small tract on the Hoke County side of the river just below US 401 that protects less than 1% of the total land in this site. Thus, most of the river floodplain is still unprotected, in many privately owned parcels.

It is hoped that these two State agencies, as well as local governments and local land trusts, can protect much more of the floodplain. Just because the river has been designated as “scenic” by

both the Federal and State governments does not mean that any protection of the land is forthcoming. And the fact that the river falls within the potential acquisition boundary of Lumber River State Park does not mean that only State Parks should have a role in protecting the floodplain. There are a number of groups interested in the scenic and recreational values of the river, and all need to take a part in protecting the land base along the river.

Some recent clearcuts have taken place in the floodplain, marring the scenic beauty of the river, as seen from the canoeist's vantage on the river. Clearcuts also introduce the potential for sedimentation, and the potential for invasion by exotic species such as Chinese privet (*Ligustrum sinense*), a major problem in disturbed floodplains. Obviously, timber harvest should be kept to a minimum, and harvest should be limited mostly to loblolly pines, if possible.

NATURAL COMMUNITIES: Cypress-Gum Swamp (Blackwater subtype), Coastal Plain Bottomland Hardwoods (Blackwater subtype), Coastal Plain Levee Forest (Blackwater subtype), Sand and Mud Bar

RARE PLANTS: sarvis holly (*Ilex amelanchier*). NOTE: The State Endangered and Federal Species of Concern Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*) is present at the ecotone of the floodplain and uplands at Chalk Banks. This rare plant site is included in the Lumber River/Chalk Banks Flatwoods and Pocosins natural area.

RARE ANIMALS: river frog (*Rana heckscheri*) – last reported in 1975

REFERENCES:

- Ash, A.N. 1990a. Site survey report: Maxton Airport Swamp; in, A Preliminary Natural Areas Inventory of the Lumber River Floodplain. Report to the N.C. Natural Heritage Program and the N.C. Nature Conservancy.
- Ash, A.N. 1990b. Site survey report: Spring Branch Church Swamp; in, A Preliminary Natural Areas Inventory of the Lumber River Floodplain. Report to the N.C. Natural Heritage Program and the N.C. Nature Conservancy.
- LeGrand, H. 2004. Site report: Lumber River Floodplain – Turnpike Road (SR 1412) to US 401. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- Lumber Wild and Scenic River website: <<http://www.nps.gov/rivers/wsr-lumber.html>>

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

LUMBER RIVER/BEAR SWAMP AQUATIC HABITAT

Site Number: 17

Site Significance: State

Ownership: Public waters

Size: about 20 river miles (in Scotland County)

Quadrangles (in Scotland County):
Wagram, Wakulla, Maxton

SIGNIFICANT FEATURES: This is one of the more scenic bodies of water in the state, with a Federal designation as a Wild and Scenic River and a State designation as a Natural and Scenic River. The river and the adjacent Bear Swamp (in Robeson County) are host to several very rare, undescribed fishes: the State Special Concern thinlip chub (*Cyprinella* sp.) and the broadtail madtom (*Noturus* sp.). A rare caddisfly – *Triaenodes marginatus* – is also present (in Bear Swamp).

LANDSCAPE RELATIONSHIPS: This site flows through the Upper Lumber River Swamp natural area. At one point just north of the Laurinburg-Maxton Airport, the Lumber River lies within a mile of the Shoe Heel Creek Floodplain, as well as Shoe Heel Creek Sand Ridge. The Drowning Creek Aquatic Habitat, as identified by the NC NHP, extends downstream only to the US 1 vicinity, and not into Scotland County. This site does, however, extend roughly 25 river miles into Robeson County, with the lower limit just upstream of Lumberton (to include Bear Swamp).

SITE DESCRIPTION: The Lumber River system originates in the extreme upper reaches of the Sandhills region in western Moore, southeastern Montgomery, and northern Richmond counties. Naked Creek and Drowning Creek are the main upper reaches, and Drowning Creek is renamed the Lumber River below Turnpike Road (SR 1412), about where Watery Branch enters the creek/river. The Lumber River forms the eastern border of the county, with Hoke County and Robeson County to the east.

The river contains good water quality for the most part, as its floodplain is mostly a forested swamp. It is a very popular canoeing location, though canoe launch areas are mostly informal. Because of the water quality, scenic character, and high use as a canoeing area, the river was designated as a State Natural and Scenic River in 1989, and in 1998 it received Federal recognition as a Wild and Scenic River. These designations extend as far upstream as SR 1412 and thus cover the entire stretch of the Lumber River passing along Scotland County.

The Scotland County portion of the river is not of State significance, but is probably of County or Regional significance by itself. However, the undescribed thinlip chub (*Cyprinella* sp.) has been found in this stretch of the river. It was previously lumped with the Santee chub (*C. zanema*) found in the Piedmont, and there is some uncertainty whether the chub in the Coastal Plain is really a subspecies of Santee chub or an undescribed species. The Robeson County portion

contains records of not only the thinlip chub but also the undescribed broadtail madtom (*Noturus* sp.) and a triaenode caddisfly (*Triaenodes marginatus*). There is a report of the State Special Concern pinewoods darter (*Etheostoma mariae*) from the river in Robeson County, but this may be a locational error. Also, the State Special Concern river frog (*Rana heckscheri*) was recorded from several floodplain sites near the river in Scotland County. However, no one has been able to re-locate the frog in the state in recent decades, and thus it may be extirpated.

PROTECTION AND MANAGEMENT: Because of the Federal and State designations listed above, new dams and other structures that inhibit the free flow of the waters of the river are prohibited. However, the designations do not regulate point and non-point discharges. This section of the Lumber River has land (buffer) protection on the west side near its upper end, at the Chalk Banks section of Lumber River State Park. Otherwise, the aquatic habitat portion of the river flows through unprotected, private lands, at least in Scotland County. (There is a small NC Wildlife Resources Commission Game Land tract on the Hoke County side of the river, just below US 401.)

No new point source discharges should be permitted in the river. Measures need to be taken to prevent sedimentation into the river. Even with such precautions, protection of river water quality is very difficult.

NATURAL COMMUNITIES: NC NHP has not yet developed an aquatic natural community classification

RARE PLANTS: None known (in the river itself)

RARE ANIMALS: Scotland County portion – thinlip chub (*Cyprinella* sp.); Robeson County portion – broadtail madtom (*Noturus* sp.), a triaenode caddisfly (*Triaenodes marginatus*)

REFERENCES:

Lumber River State Park website: <<http://www.ils.unc.edu/parkproject/visit/luri/home.html>>

Lumber Wild and Scenic River website: <<http://www.nps.gov/rivers/wsr-lumber.html>>

STAND-ALONE SITES (not within a cluster)

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

JUNIPER CREEK CEDAR SWAMPS

Site Number: 18

Size: 1,090 acres; about 8 creek miles

Site Significance: Regional

Quadrangles: Silver Hill, Laurinburg

Ownership: N.C. Wildlife Resources Commission (10%),
multiple private (90%) (includes U.S. Fish & Wildlife Service easement)

SIGNIFICANT FEATURES: The floodplain contains perhaps as much Atlantic white-cedar (*Chamaecyparis thyoides*) as any other creek in the Sandhills region. An isolated tract of the Sandhills Game Land abuts the floodplain and contains several notable wet areas in the uplands. Juniper Creek contains two rare fish species: the Special Concern pinewoods darter (*Etheostoma mariae*) and sandhills chub (*Semotilus lumbee*). The Significantly Rare silvery sedge (*Carex canescens* ssp. *disjuncta*) is found on pond margins along the creek.

LANDSCAPE RELATIONSHIPS: The somewhat similar Jordan Creek Floodplain parallels the Juniper Creek floodplain, about 1.5 to 3 miles to the south and southwest. The bulk of the Sandhills Game Land lies about 2 miles to the north.

SITE DESCRIPTION: This section of Juniper Creek is apparently not impeded by man-made dams, as McNair Pond has been drained. At least one beaver pond is present, along Beaver Dam Creek near SR 1331. There are, however, at least four bridge crossings (counting a railroad trestle). Juniper Creek is aptly named, as “juniper” – Atlantic white-cedar (*Chamaecyparis thyoides*) – is locally common. One patch of the cedar is home to a population of the State Significantly Rare Hessel’s hairstreak (*Callophrys hesseli*) butterfly. Though the floodplain is less than 0.5-mile wide in most areas, it does have a very wide segment near the US 15-501 crossing, where the floodplain reaches 1.0-mile wide between that highway and SR 1423.

Juniper Creek seems devoid of cypress species, at least as seen from roads, and swamp tupelo (*Nyssa biflora*) also seems scarce. However, portions are dominated by a mix of pond pine (*Pinus serotina*) and loblolly pine (*P. taeda*), such as along US 15-501. The floodplain contains large amounts of broadleaf evergreen species, such as American holly (*Ilex opaca*) and redbay (*Persea palustris*) in the subcanopy; and shining fetterbush (*Lyonia lucida*), big gallberry (*Ilex coriacea*), and coastal doghobble (*Leucothoe axillaris*) in the shrub layer. Thus, this creek’s floodplain contains somewhat less of the more typical Coastal Plain Small Stream Swamp (Blackwater subtype) community (as seen in the Jordan Creek Floodplain) and more blending of pocosin communities such as Pond Pine Woodland, Streamhead Pocosin, and Streamhead Atlantic White Cedar Forest.

The small area of Sandhills Game Land included in this site – Block I – contains mostly typical upland longleaf pine (*Pinus palustris*) stands. However, there are wet flats, unusual for the Sandhills region, which are Small Depression Pocosin natural communities. These wetlands

contain sphagnum moss, titi (*Cyrilla racemiflora*), and honey-cups (*Zenobia pulverulenta*), among other shrubs found mainly along streamsides.

Both of the Sandhills' two State Special Concern fishes, the pinewoods darter (*Etheostoma mariae*) and the sandhills chub (*Semotilus lumbee*), have been found in Juniper Creek within the site. The Significantly Rare silvery sedge (*Carex canescens* ssp. *disjuncta*) has been found on pond margins along the creek.

PROTECTION AND MANAGEMENT: A total of 187 acres in the floodplain just east of US 15-501 has been protected by a U.S. Fish and Wildlife Service perpetual conservation easement. A few dozen acres on the west side of the floodplain above SR 1324 are protected within the N.C. Wildlife Resources Commission's Block I of the Sandhills Game Land. The remaining 75% of the floodplain is unprotected.

Timber harvest should be limited to removal of loblolly pines, in order to preserve the integrity of the hardwood, white-cedar, and pond pine stands. Logging in floodplains opens up a site to massive invasion of exotic species, especially privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), and Japanese stilt grass (*Microstegium vimineum*). Some areas dominated by cedar or pines could be managed with prescribed burns.

NATURAL COMMUNITIES: Streamhead Pocosin, Small Depression Pocosin, Streamhead Atlantic White Cedar Forest, Pond Pine Woodland, Coastal Plain Small Stream Swamp (Blackwater subtype)

RARE PLANTS: silvery sedge (*Carex canescens* ssp. *disjuncta*)

RARE ANIMALS: Hessel's hairstreak (*Callophrys hesseli*), pinewoods darter (*Etheostoma mariae*), sandhills chub (*Semotilus lumbee*)

REFERENCES:

- LeGrand, H. 2004a. Site report: Juniper Creek Floodplain. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2004b. Site report: Juniper Creek Floodplain – McLean easement tract. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2004c. Site survey report form: Sandhills Game Land – Block I. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

JORDAN CREEK FLOODPLAIN

Site Number: 19

Site Significance: County

Ownership: multiple private

Size: 1,025 acres; about 9 creek miles

Quadrangles: Marston, Silver Hill,
Laurinburg

SIGNIFICANT FEATURES: The relatively narrow floodplain contains a moderate amount of the rather scarce Atlantic white-cedar (*Chamaecyparis thyoides*) and stands of pond-cypress (*Taxodium ascendens*). The site encompasses a millpond (Monroe Mill Pond), and two rare species – a fish and a plant – occur in Jordan Creek itself: the State Special Concern pinewoods darter (*Etheostoma mariae*) and the Significantly Rare swaying bulrush (*Schoenoplectus subterminalis*).

LANDSCAPE RELATIONSHIPS: This floodplain parallels the Juniper Creek Cedar Swamps site, located roughly 1.5 to 3 miles to north and northeast of Jordan Creek. Little Juniper Creek Bay lies about 2 miles east of the lower end of Jordan Creek Floodplain, whereas Richmond Mill Natural Area lies about 3 miles to the southwest of Jordan Creek.

SITE DESCRIPTION: Jordan Creek flows southeastward from the Sandhills region onto the Southern Inner Coastal Plain flatlands, where it joins Shoe Heel Creek just west of the Laurinburg-Maxton Airport in the southeastern portion of the county. Its floodplain is rather narrow, being up to 0.8-mile wide below the natural area near where it joins Shoe Heel Creek, and 0.6-mile wide a few miles above US 15-501. However, most of the floodplain is roughly 0.3-mile wide, at best. The segment of the creek in the natural area is crossed by three roads, and six others cross the floodplain farther south.

Most of the floodplain below SR 1324 appears to be mostly a mix of various hardwoods and loblolly pines (*Pinus taeda*). Near this road, the floodplain narrows, and some Atlantic white-cedar (*Chamaecyparis thyoides*) is mixed with the mature hardwood stand. “Pocosin” evergreen species are common in the understory and shrub layers, including redbay (*Persea palustris*), big gallberry (*Ilex coriacea*), shining fetterbush (*Lyonia lucida*), and especially coastal doghobble (*Leucothoe axillaris*).

Near the center of the site is Monroe Mill Pond, which is ringed by a stand of pond-cypress (*Taxodium ascendens*). The forest just below the millpond (southeast of SR 1334) is also mature, with white-cedar mixed with mature hardwoods such as tuliptree (*Liriodendron tulipifera*). The white-cedar occurs spottily upstream, and some dense stands are present below SR 1341. One area of uplands just to the west of the creek, south of SR 1341, is included in the natural area, as the owners have burned the stands of longleaf pine (*Pinus palustris*) on the sandhills.

One of the two rare Sandhills fishes – pinewoods darter (*Etheostoma mariae*) – has been found in Jordan Creek at several locations. (The sandhills chub [*Semotilus lumbee*] has been found in a number of creeks in the county and is possible in this section of Jordan Creek.) Also, the rare swaying bulrush (*Schoenoplectus subterminalis*) has been found in the creek just below Monroe Mill Pond.

PROTECTION AND MANAGEMENT: There appear to be no protected tracts within this large and long natural area. It does not incorporate any tracts of the Sandhills Game Land. Because the site has numerous landowners, it would be difficult to protect the entire site; thus, protection efforts might focus on the larger tracts, or Monroe Mill Pond, for example.

The site does contain some clearcuts and regenerating forests, as would be expected in a site this large. Of course, no further timber harvest is recommended, unless it is to remove loblolly pines.

NATURAL COMMUNITIES: Coastal Plain Semipermanent Impoundment, Coastal Plain Small Stream Swamp (Blackwater subtype)

RARE PLANTS: swaying bulrush (*Schoenoplectus subterminalis*)

RARE ANIMALS: pinewoods darter (*Etheostoma mariae*)

REFERENCES:

- LeGrand, H. 2003. Site report: Jordan Creek Sandhills. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- LeGrand, H. 2004. Site report: Jordan Creek Floodplain. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

RIVERTON ROAD BAY RIM

Site Number: 20

Site Significance: Regional

Ownership: private

Size: 402 acres (136 Primary boundary, 266 Secondary boundary)

Quadrangle: Wakulla

SIGNIFICANT FEATURES: This is one of the most extensive sand rims of a Carolina bay west of the Bladen Lakes bay region. The sand rim on the east and south sides of the bay runs approximately 0.8 mile north to south and 0.5 mile east to west. The relatively scarce Sand Barren natural community is present on the bay rim.

LANDSCAPE RELATIONSHIPS: The Upper Lumber River Swamp lies less than a mile to the east of the bay. Roughly 2 miles to the southwest lies the McIntosh Bay Complex, whereas the southern end of the Lumber River/Chalk Banks Flatwoods and Pocosins site lies about 2 miles to the north.

SITE DESCRIPTION: There are two fairly large – nearly one mile in length from northwest to southeast -- clay-based Carolina bays south of Wagram. A powerline clearing bisects the northern bay. This bay has a remarkable extent of sand on the southeastern half of the bay rim, whereas the southern bay essentially lacks such a sand rim. The outer portion of the northern bay's rim is mainly a Pine/Scrub Oak Sandhill (Mixed Oak variant). The middle-aged canopy is composed of southern red oak (*Quercus falcata*), water oak (*Q. nigra*), a scattering of loblolly pine (*Pinus taeda*) and longleaf pine (*P. palustris*), and a few other species. A handful of sand laurel oak (*Q. hemisphaerica*) – infrequent in Scotland County, scrub post oak (*Q. margaretta*), and mockernut hickory (*Carya tomentosa*) are present. The understory contains persimmon (*Diospyros virginiana*), flowering dogwood (*Cornus florida*), and sassafras (*Sassafras albidum*). Poison-oak (*Toxicodendron pubescens*) is very common, and Small's greenbrier (*Smilax smallii*) is a surprising member of the woody vine composition; this is a rare species in this part of the state. The extreme southeastern corner contains a Xeric Sandhill Scrub community, where turkey oaks (*Q. laevis*) are very dense. Unfortunately, the southern end of the rim was clearcut in 2004.

The top of the rim and the inner half contains a good-quality Sand Barren community. Longleaf pines are scattered, and turkey oak is 30-feet tall and reasonably common. Much bare sand is present, but there are large clumps of ericaceous shrubs throughout; dangleberry (*Gaylussacia frondosa*), dwarf huckleberry (*G. dumosa*), and staggerbush (*Lyonia mariana*) are the main species. Reindeer lichen (*Cladonia* sp.) is abundant, and some herbs are present such as wire-plant (*Stipulicida setacea*).

North of the powerline clearing are additional Sand Barrens, though portions contain loblolly pine. Wire-plant and October-flower (*Polygonella polygama*) are very abundant; a few eastern prickly-pears (*Opuntia humifusa*) are present.

The interior of the bay has been highly thinned in the past, and many logging roads are present. A few medium-aged pond-cypress (*Taxodium ascendens*) trees still remain. This appears to have formerly been a Cypress Savanna community, but the low water table (perhaps pulled down by well-pumping) has allowed hardwood saplings to highly impact this community. The old logging roads and some openings are vegetated in sedges and other herbs, though they will soon be overtaken by woody vegetation. The powerline clearing does contain a few savanna species – orange milkwort (*Polygala lutea*) is common, and savanna iris (*Iris tridentata*) is quite numerous. Scattered yellow pitcher-plants (*Sarracenia flava*) and bladderwort (*Utricularia juncea*) grow along one logging road/clearing north of the powerline, suggesting the potential for noteworthy herbaceous plants in the bay.

PROTECTION AND MANAGEMENT: There is no protection for the bay or the bay rim. As the site is privately owned and divided into a number of tracts, protection of the entire bay and rim will be a difficult task.

As with most sandy areas, there is ATV usage, though this particular rim seems to contain no rare species (unlike with the Green Pond Bay Rim – Site 26). There is evidence of some sand removal north of the powerline. The recent clearcut of the southern edge of the rim, though very unsightly, likely will not overly harm the rim, as longleaf pine and scrub oaks presumably will return. However, some fire may be needed in places to maintain the typical vegetation and to keep loblolly pine and some species of hardwoods from dominating the ridge.

The bay itself has actually benefitted from logging, and clearcutting provides temporary habitat for herbaceous species. In theory, it would be helpful to attempt to restore hydrology – i.e., make the bay wetter, but this appears unlikely. However, it is important that the bay not be converted to pine plantations. Burning of the bay would be beneficial to slow the growth of hardwoods.

NATURAL COMMUNITIES: Sand Barren, Xeric Sandhill Scrub, Pine/Scrub Oak Sandhill (Mixed Oak variant)

RARE PLANTS: Watch List – yellow pitcher-plant (*Sarracenia flava*)

RARE ANIMALS: None known

REFERENCES:

LeGrand, H. 2004. Site report: Riverton Road Bay Rim. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

McINTOSH BAY COMPLEX

Site Number: 21

Size: 498 acres

Site Significance: National

Quadrangle: Laurinburg

Ownership: The Nature Conservancy (47%), private

SIGNIFICANT FEATURES: The site contains a series of four clay-based Carolina bays of high biological significance. Two have high-quality examples of the rare Cypress Savanna (Typic variant) natural community. Another bay is essentially treeless and is an unusual Depression Meadow variant of Cypress Savanna. The state's only location for the Federally Endangered Canby's dropwort (*Oxypolis canbyi*) occurs in one of the bays. At least 10 other rare plants are present. The bays are also critical breeding habitat for rare amphibians, such as for Eastern tiger salamander (*Ambystoma tigrinum*) and Carolina gopher frog (*Rana capito*).

LANDSCAPE RELATIONSHIPS: The natural area is somewhat remote from other significant clay-based bays in the state, being at least 5 miles from any others. The nearest significant sites are Little Juniper Creek Bay about 1.5 miles to the west, the downstream end of Juniper Creek Cedar Swamps about 1.5 miles to the northwest, and Shoe Heel Creek Floodplain, whose northern terminus is about 2 miles to the southeast.

SITE DESCRIPTION: This natural area consists of four contiguous Carolina bays. The northernmost – Laurinburg Pond (also known to biologists by the private owner's name) – is one of the most unusual of the clay-based bays in the state, being considered by the NC NHP as a Cypress Savanna (Depression Meadow variant). This 40-acre bay is treeless, apparently never having been forested (no tree stumps have been noted), and consists of open water after heavy rainfall or at times in winter and early spring. For most of the year, the pond is marshy, varying from nearly dry to containing some water. Southern cutgrass (*Leersia hexandra*) dominates the bay, but many rare plants are present, with the most significant being a large population of the State Threatened and Federal Species of Concern awned meadow-beauty (*Rhexia aristosa*). This bay is highly important to breeding amphibians, in particular to two State Threatened species – eastern tiger salamander (*Ambystoma tigrinum*) and Carolina gopher frog (*Rana capito*).

The bay just south of Laurinburg Pond – Big Cypress Meadow – is also highly significant. This is one of the best examples of a Cypress Savanna (Typic variant) in the state. Water is present in the bay for most of the year, but never to the ponded extent in Laurinburg Pond. Pond-cypress (*Taxodium ascendens*) dominates the canopy, though some loblolly pine (*Pinus taeda*) is present. The small tree/shrub layers are poorly represented, so the bay has the aspect of scattered trees over a dense and diverse herb layer, of much diversity. A wide variety of grasses and sedges are present. Of most significance is the once fairly large population of Canby's dropwort (*Oxypolis canbyi*), which is restricted to only a handful of Carolina bays or other similar depressions in its range; this is the only known site for it in North Carolina. However, it has seemingly vanished in

the past year or two, probably owing to lowered water levels (drought and other factors). As with Laurinburg Pond, this bay is a very important breeding site for salamanders and frogs.

The other two bays – generally called 401 Bay and Backside Bay – are much less significant. The former bay, also called Rabbit Run Bay, is bisected by US 401 and contains a rather unusual form of Cypress Savanna (Typic variant). It consists of a rather dense forest, composed mainly of pond-cypress and pond pine (*Pinus serotina*) in the canopy, and a moderate zone of “pocosin” shrubs beneath the trees, with shining fetterbush (*Lyonia lucida*) being common. Backside Bay is the smallest bay of the four, lying just east of 401 Bay. It is mainly dry and contains “weedy” native trees such as loblolly pine, sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), and water oak (*Quercus nigra*). Nonetheless, each of these two bays is also significant for breeding by amphibians.

The matrix between the bays has mostly been cut-over sandhills. Cropland lies between Big Cypress Meadow and 401 Bay. A few remnants of sandhills vegetation is present along the eastern side of 401 Bay.

PROTECTION AND MANAGEMENT: The Nature Conservancy owns and protects nearly 235 acres of the site, of which 128 acres are a Dedicated State Nature Preserve. Their ownership includes the eastern 35% of Big Cypress Meadow, the eastern 30-35% of 401 Bay, nearly all of Backside Bay, and some cut-over sandhills, but just the southern tip of Laurinburg Pond. Fortunately, the private owner of the remainder of Laurinburg Pond has protected the bay as a Registered Natural Heritage Area. Thus, sizable portions of all four bays are protected, but the majority of Big Cypress Meadow and 401 Bay are not protected, nor is Laurinburg Pond protected in perpetuity. Thus, continued acquisition or permanent private conservation agreements of the bays and surrounding habitat by The Nature Conservancy and other conservation entities are very important.

Some fire management has been done by TNC in the bays, at least in Big Cypress Meadow, to control the spread of loblolly pines. A drainage ditch in Laurinburg Pond is a bit of a concern, especially as trees such as loblolly pines have grown up along the drier banks of the ditch (at least at the southeastern end of the bay). TNC has planted seedling longleaf pines in former fields surrounding Backside Bay in order to restore the former sandhills community present there.

NATURAL COMMUNITIES: Cypress Savanna (Typic and Depression Meadow variants)

RARE PLANTS: Florida goober grass (*Amphicarpum muehlenbergianum*), small-headed marsh elder (*Iva microcephala*), Boykin’s lobelia (*Lobelia boykinii*), shrubby seedbox (*Ludwigia suffruticosa*), Canby’s dropwort (*Oxypolis canbyi*), southeastern panic grass (*Panicum tenerum*), mudbank crown grass (*Paspalum dissectum*), awned meadow-beauty (*Rhexia aristosa*), Tracy’s beaksedge (*Rhynchospora tracyi*), quillwort arrowhead (*Sagittaria isoetiformis*), netted nutrush (*Scleria reticularis*)

RARE ANIMALS: Mabee's salamander (*Ambystoma mabeei*), eastern tiger salamander (*Ambystoma tigrinum*), chicken turtle (*Deirochelys reticularia*), dwarf salamander - silver morph (*Eurycea quadridigitata* pop 1), ornate chorus frog (*Pseudacris ornata*), Carolina gopher frog (*Rana capito*), King's hairstreak (*Satyrium kingi*)

REFERENCES:

- LeGrand, H.E., Jr. 2003. Site report: McIntosh Bay Complex. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- N.C. Natural Heritage Program. 1980. Laurinburg Pond. N. C. Natural Heritage Program report.
- Nifong, T.D. 1982. The "Clay Subsoil" Carolina Bays of North Carolina. The Nature Conservancy.
- Roe, C., and J. Moore. 1983. Big Cypress Meadow Carolina Bay (Laurinburg 401 Bay Complex). N.C. Natural Heritage Program, registry proposal.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

LITTLE JUNIPER CREEK BAY

Site Number: 22

Size: 76 acres

Site Significance: County

Quadrangle: Laurinburg

Ownership: Private

SIGNIFICANT FEATURES: This is one of the few known peat-based bays in the county, at least one of the few still in moderately good condition. The High Pocosin vegetation in the bay is somewhat unusual, as is the presence of Atlantic white-cedar (*Chamaecyparis thyoides*).

LANDSCAPE RELATIONSHIPS: The McIntosh Bay Complex lies about 1.5 miles to the east of the natural area. The lower end of the Juniper Creek Cedar Swamps lies about 1.5 miles to the north, and the lower end of the Jordan Creek Floodplain lies about 2 miles to the west, of Little Juniper Creek Bay.

SITE DESCRIPTION: Though there are hundreds if not a few thousand Carolina bays in Scotland County, few still contain natural vegetation, or at least remnants of natural communities. A bay just to the west of Little Juniper Creek, here called “Little Juniper Creek Bay”, contains natural vegetation, though the exact natural community(s) present are subject to debate. The northwestern quarter of the bay is a dense evergreen High Pocosin, with shrubs averaging 7-feet tall. Big gallberry (*Ilex coriacea*) and shining fetterbush (*Lyonia lucida*) dominate. Other shrubs include highbush blueberry (*Vaccinium fuscatum*), redbay (*Persea palustris*), titi (*Cyrilla racemiflora*), sweet pepperbush (*Clethra alnifolia*), red chokeberry (*Aronia arbutifolia*), obovate coastal juneberry (*Amelanchier obovalis*), honey-cups (*Zenobia pulverulenta*), sweetbay magnolia (*Magnolia virginiana*), and sapling-sized Atlantic white-cedar (*Chamaecyparis thyoides*). Bamboo-vine (*Smilax laurifolia*) is very common. Toward the center and eastern portions is a stand of trees: red maple (*Acer rubrum*), tuliptree (*Liriodendron tulipifera*), redbay, and a scattering of white-cedars are present. This tree-dominated section of the bay is tentatively considered as a “new” natural community – the Coastal Plain Depression Swamp (Schafale, in prep.).

The southwestern portion of the bay has been disturbed. This portion contains a very dense stand of deciduous saplings, and much blackberry (*Rubus argutus*) is present along the margin. However, the south end of the bay is reasonably intact and is similar to the northwestern portion. Swamp doghobble (*Leucothoe racemosa*) is present, and red chokeberry is common among the evergreen shrubs. Coastal doghobble (*Leucothoe axillaris*) is present along the margin at the southern end. The southeastern corner is forested and connects with the trees along the eastern margin. A moderate amount of mature white-cedar is present, though greatly outnumbered by various hardwoods. Some flowering dogwood (*Cornus florida*) is present.

Unfortunately, most the uplands surrounding the bay have been highly altered. Clearcuts and pine plantations are present on all sides but the east.

PROTECTION AND MANAGEMENT: The natural area is privately owned and is unprotected. Acquisition of the bay is a possible protection option, as is a conservation easement.

The best management for the bay is simply to leave it alone, with no more timber harvest. No ditches should be cut into the bay. As pine plantations surround the bay, there is a concern that the owner could attempt to drain the bay and convert the bay into more pine plantations. Bays such as this should be burned to allow the white-cedar to propagate and to keep hardwoods from invading.

NATURAL COMMUNITIES: High Pocosin, Coastal Plain Depression Swamp

RARE PLANTS: None known

RARE ANIMALS: None known

REFERENCES:

LeGrand, H. 2004. Site report: Little Juniper Creek Bay. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

SHOE HEEL CREEK FLOODPLAIN

Site Number: 23

Site Significance: County

Ownership: multiple private

Size: 2,095 acres; about 9 creek miles (in Scotland County)

Quadrangles: Johns, Laurinburg, Maxton, Wakulla

SIGNIFICANT FEATURES: The floodplain of this creek is the widest, on average, in Scotland County, even more so than the Lumber River. In addition, most of the floodplain contains medium-aged to mature forest and provides the most extensive example in the county of the Coastal Plain Small Stream Swamp (Blackwater subtype) natural community. The State Special Concern pinewoods darter (*Etheostoma mariae*) has been found in the creek, at several locations.

LANDSCAPE RELATIONSHIPS: The Shoe Heel Creek Sand Ridge borders this natural area on the east side, just west of the Laurinburg-Maxton Airport. The Lumber River (e.g., Upper Lumber River Swamp) lies as close as 0.5 mile, just north of the airport. The Shoe Heel Creek Floodplain site continues south into Robeson County to include Maxton Pond.

SITE DESCRIPTION: Shoe Heel Creek's floodplain averages 0.6 - 0.85 mile wide for most of its length in Scotland County, making it the widest (on average) in the county. On the negative side, the natural area identified here is crossed by five roads and one railroad, including both US 74 Business and US 74 Bypass. Remarkably, there has been relatively little wholesale clearcutting of the floodplain, perhaps because of its wetness. Though the exotic Chinese privet (*Ligustrum sinense*) is common along the road margins in the floodplain, the interior vegetation is mostly in natural, mature condition.

In general, a hardwood swamp – Coastal Plain Small Stream Swamp (Blackwater subtype) – is the dominant community. Red maple (*Acer rubrum*), swamp tupelo (*Nyssa biflora*), tuliptree (*Liriodendron tulipifera*), laurel oak (*Quercus laurifolia*), and sweetgum (*Liquidambar styraciflua*) are common canopy trees. Pond-cypress (*Taxodium ascendens*) is locally numerous; and such sites, especially where mixed with tupelo, are best called Cypress-Gum Swamp (Blackwater subtype) natural community. Atlantic white-cedar (*Chamaecyparis thyoides*) is uncommon as compared with the Juniper and Jordan creek floodplains. However, as with those floodplains, broadleaf evergreens such as American holly (*Ilex opaca*), shining fetterbush (*Lyonia lucida*), and big gallberry (*Ilex coriacea*) are widespread in the understory and shrub layers. Pond pine (*Pinus serotina*) is quite scarce on this creek, further indicating that Shoe Heel Creek is a more typical blackwater stream of the Southern Inner Coastal Plain than the more “sandhills/pocosin” trending Juniper and Jordan creeks.

The Scotland County section of the floodplain contains no millponds, though Maxton Pond lies less than a mile south of the Robeson County line, and another man-made lake lies a mile to the north of the site along SR 1427. The lower portion of Jordan Creek near its confluence with Shoe Heel Creek is quite wide (over 0.8 mile). However, there are some recent clearcuts in this portion, and thus there is a roughly 5-mile gap in identified natural areas between Shoe Heel Creek Floodplain and the lower end of the Jordan Creek Floodplain natural area.

The Significantly Rare Mabee's salamander (*Ambystoma mabeei*) has been found in the floodplain just northeast of US 74 Business. However, this site might now be an historic one, and the species is essentially limited in the county to clay-based bays and man-made ponds (e.g., McIntosh Bay Complex and Wagram Borrow Pit Amphibian Site).

PROTECTION AND MANAGEMENT: There appear to be no protected lands in this extensive floodplain. The Laurinburg-Maxton Airport Authority owns much land on the eastern side of the floodplain, west of the airport (and west of SR 1434), though this is not considered to be conservation lands.

Timber harvest should be limited in the floodplain to protect the character of the swamp. The abundance of privet along most of the road margins attests to the ease at which exotic plants invade disturbances to floodplains. No additional dams should be allowed on the creek, in order to keep the creek as free-flowing as possible.

NATURAL COMMUNITIES: Coastal Plain Small Stream Swamp (Blackwater subtype), Cypress-Gum Swamp (Blackwater subtype)

RARE PLANTS: None known

RARE ANIMALS: Mabee's salamander (*Ambystoma mabeei*), pinewoods darter (*Etheostoma mariae*)

REFERENCES:

LeGrand, H. 2004. Site report: Shoe Heel Creek/Jordan Creek Floodplains. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

SHOE HEEL CREEK SAND RIDGE

Site Number: 24

Size: 326 acres

Site Significance: County

Quadrangles: Wakulla, Laurinburg

Ownership: Laurinburg-Maxton Airport Authority

SIGNIFICANT FEATURES: The natural area contains a fairly rare geomorphic feature for the county and for a rather small blackwater creek – aeolian sand deposits. The sand ridge contains xeric vegetation with considerable longleaf pine (*Pinus palustris*) and a variety of scrub oak species – a fair-quality example of the Pine/Scrub Oak Sandhill (Mixed Oak variant) natural community.

LANDSCAPE RELATIONSHIPS: The natural area lies immediately along the east side of the Shoe Heel Creek Floodplain natural area. It also lies within 0.5 mile of the Upper Lumber River Swamp natural area, located just to the east. The nearest other natural area is McIntosh Bay Complex, about 3 miles to the north-northwest.

SITE DESCRIPTION: Field notes were taken from public roads, and the description was compiled from notes and aerial photographs. The natural area consists of two separate units, one just north of the airport and the second to the southwest; both lie essentially west of Airport Road (SR 1434). Both units are bisected by abandoned roads and telephone lines.

The southern unit, more easily visible from SR 1434, contains a mature canopy of longleaf pines, with an understory of turkey oak (*Quercus laevis*), water oak (*Q. nigra*), and American holly (*Ilex opaca*), among other species. Sweetleaf (*Symplocos tinctoria*) is a common shrub or small tree. Farther north, the stand is mixed with hardwoods in the canopy – such as blackjack oak (*Q. marilandica*), scrub post oak (*Q. margaretta*), southern red oak (*Q. falcata*), and mockernut hickory (*Carya tomentosa*). A fair amount of loblolly pine (*P. taeda*) is present here. Other species present include bluejack oak (*Q. incana*), flowering dogwood (*Cornus florida*), sweet pepperbush (*Clethra alnifolia*), inkberry (*Ilex glabra*), and waxmyrtle (*Myrica cerifera*). A vine of note is Small's greenbrier (*Smilax smallii*), uncommonly seen in this part of the Coastal Plain.

The northern unit contains a slightly larger block of longleaf pines, but the block is very dense with understory trees. The primary area lies off the public roads, and thus few notes were taken; it is bounded by SR 1433 on the north, SR 1407 on the east, SR 1434 on the south, and an un-numbered road on the west.

PROTECTION AND MANAGEMENT: The natural area is not protected. The best protection of the sand ridge and its vegetation is likely through management easements/agreements.

The site is highly fire-suppressed, as evidenced by the abundance of species such as water oak and loblolly pine, which thrive in dry soils that have not burned for many decades. Areas dominated by longleaf pine traditionally burned once to several times a decade. These pine stands are so dense now, and have had major hardwood encroachment, that fire could not be considered without first some removal of hardwoods and pines, particularly loblolly pines. Even some longleaf pines should be harvested. The key is to open up the site enough to have longleaf pine regeneration and a thriving herbaceous species layer.

Most of the sand ridge due west of the airport has been clearcut or otherwise destroyed in recent years. Of course, clearcuts will re-vegetate into some semblance of sandhills in upcoming years. It is important that development, in particular construction of airport facilities, be excluded from the higher quality areas on this noteworthy sand ridge.

NATURAL COMMUNITIES: Pine/Scrub Oak Sandhill (Mixed Oak variant)

RARE PLANTS: None known

RARE ANIMALS: None known

REFERENCES:

LeGrand, H. 2003. Site report: Shoe Heel Creek Sand Ridge. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

RICHMOND MILL NATURAL AREA

Site Number: 25

Size: 1,267 acres

Site Significance: Regional

Quadrangle: Gibson

Ownership: private

SIGNIFICANT FEATURES: This is a very large site nearly all in a single ownership, featuring a wide array of natural communities, including the largest man-made lake – Richmond Mill Lake – in the county. The natural area contains several small stands of sandhills vegetation, mainly Pine/Scrub Oak Sandhill (Mixed Oak variant) natural community. A powerline that crosses the natural area provides habitat for a number of “savanna” herbs and shrubs, including the State Significantly Rare white wicky (*Kalmia cuneata*). Other rare plants known from the site include the State Threatened and Federal Species of Concern spring-flowering goldenrod (*Solidago verna*), the Significantly Rare and Federal Species of Concern Conferva pondweed (*Potamogeton confervoides*), and the Significantly Rare Canby’s bulrush (*Schoenoplectus etuberculatus*). The Federally Endangered red-cockaded woodpecker (*Picoides borealis*) has occurred on the site.

LANDSCAPE RELATIONSHIPS: The nearest significant natural area is the Currie Road/Crawford Lake Road Sandhills, which is roughly 1.5 miles to the northwest at its closest point.

SITE DESCRIPTION: Richmond Mill Natural Area lies along the transition between the Southern Inner Coastal Plain and Sandhills regions. The northwestern portion of the natural area lies in the Sandhills, but the lake lies outside the Sandhills. Thus, most of the site is relatively flat or gently sloping, but there are some fairly steep slopes, including a few unusual outcroppings (for the sandhills) of “paint rock” boulders about 3 feet across.

Richmond Mill is a community at the base of the dam of Richmond Mill Lake, which has impounded about 1.3 miles of Gum Swamp Creek. The lake contains numerous pond-cypress trees (*Taxodium ascendens*), though no inventory was conducted at the lake or along its fringes. Stands of longleaf pine (*Pinus palustris*), mainly the Pine/Scrub Oak Sandhill (Mixed Oak variant) natural community, are present west of the lake and Gum Swamp Creek. Because of fire management, there is a good cover of grasses and forbs in many places beneath the pines. The creek’s floodplain is heavily forested, mostly with swamp tupelo (*Nyssa biflora*), but Atlantic white-cedar (*Chamaecyparis thyoides*) and laurel oak (*Quercus laurifolia*) are also present.

A powerline crosses the site in an east-west manner. Where it descends from an upland toward Upper Beaverdam Creek is a seepage that provides habitat for some “savanna” plants such as yellow pitcher-plant (*Sarracenia flava*), sundews (*Drosera intermedia*, *D. capillaris*), and meadow-beauties (*Rhexia alifanus*, *R. petiolata*, *R. nashii*). Honey-cups (*Zenobia pulverulenta*) dot the powerline clearing, and the Significantly Rare white wicky (*Kalmia cuneata*) is another shrub that grows in the clearing.

Along SR 1337, on the eastern boundary of the site, grows a sizable population of the State Threatened and Federal Species of Concern spring-flowering goldenrod (*Solidago verna*). Most of the plants occur west of the road. In 1957, Conferva pondweed (*Potamogeton confervoides*), Significantly Rare and a Federal Species of Concern; and Canby's bulrush (*Schoenoplectus etuberculatus*), Significantly Rare, were found at Patterson Pond at the head of Richmond Mill Lake on Upper Beaverdam Creek.

The Federally Endangered red-cockaded woodpecker (*Picoides borealis*) has occurred on the site, but it has not been seen in the past few years. At least three cavity trees are present just north of the natural area, but on the same privately-owned tract. Watch List animals at the site include the eastern fox squirrel (*Sciurus niger*) and the byssus skipper (*Problema byssus*); the latter was seen on the site visit and represented the first report of this butterfly for Scotland County and one of just a few reports for the Sandhills region.

Further inventory of this large site is recommended. There was no survey conducted on the lake or its fringes, and the powerline clearing likely holds many more rare plant species than could be detected on a single site visit. The flat lands in the Gum Swamp Creek floodplain and to the east of the creek also may harbor noteworthy species.

PROTECTION AND MANAGEMENT: The natural area is nearly completely owned by a single large company, which manages the area for multiple activities. The tracts owned by the company are registered with the U.S. Fish and Wildlife Service as Safe Harbor lands, but there is otherwise no formal protection of the natural area. Though acquisition of the site or part of it for protection are unlikely, there appears to be opportunity for permanent conservation easements on portions of the tract.

Company staff farm a number of fields on the tract, rake pine straw for sale, and conduct burns to promote wildlife habitat, for hunting and other purposes. Bird nest boxes are maintained, as well. Some old fields have been planted back into longleaf pine, for future pine straw harvest.

The prescribed burns have been a benefit to wildlife and the natural communities. However, pine straw raking is always detrimental to the herb layer, and removal of straw makes it more difficult to pass fire through a stand. Thus, raking should be limited to those portions where the pines are fairly young or dense, and not be done where the fires have promoted a good array of herbaceous plants.

NATURAL COMMUNITIES: Pine/Scrub Oak Sandhill (Mixed Oak variant), Coastal Plain Semipermanent Impoundment, Coastal Plain Small Stream Swamp (Blackwater subtype)

RARE PLANTS: white wicky (*Kalmia cuneata*), Conferva pondweed (*Potamogeton confervoides*), Canby's bulrush (*Schoenoplectus etuberculatus*), spring-flowering goldenrod (*Solidago verna*)

RARE ANIMALS: red-cockaded woodpcker (*Picoides borealis*); Watch List – eastern fox squirrel (*Sciurus niger*), byssus skipper (*Problema byssus*)

REFERENCES:

LeGrand, H. 2003. Site report: Richmond Mill Natural Area. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

GREEN POND BAY RIM

Site Number: 26

Site Significance: State

Ownership: private

Size: 366 acres (50 in Primary boundary,
316 in Secondary boundary)

Quadrangle: Ghio

SIGNIFICANT FEATURES: The natural area contains one of the state's best examples of Sand Barren natural community. Examples of several other communities are located along the ecotone between the Sand Barren and the bay proper. This Sand Barren features one the larger populations of the State Endangered and Federal Species of Concern Pickering's dawnflower (*Stylisma pickeringii* var. *pickeringii*) in North Carolina; in addition, most other state populations occur along roadbanks and other disturbed sands. The state's first and only known confirmed record of Michaux's whitlow-wort (*Paronychia herniarioides*) was found at this site during the inventory.

LANDSCAPE RELATIONSHIPS: Green Pond is isolated from other Natural Heritage sites. The nearest in the county are 6 miles away to the northeast at Richmond Mill Natural Area and to the north-northeast at Highland Road Sandhills.

SITE DESCRIPTION: Green Pond is a remarkably large (0.9-mile long by 0.6-mile wide) Carolina bay, located in the extreme southwestern corner of the county, less than a mile from the South Carolina state line. Unlike most bays in Scotland County, it is not evident that pond-cypresses (*Taxodium ascendens*) were ever dominant in the bay, and thus it likely cannot be called a clay-based bay. Its original natural community is uncertain. Most of the interior of the bay is now a mature loblolly pine (*Pinus taeda*) forest, with relatively little biological significance, though the entire bay is included in a secondary boundary of the site. There are no obvious ditches in the bay, but the bay is essentially dry now.

This bay has a remarkably wide sand rim on the northeastern and eastern sides. Though there has been slight impacts due to ATV usage and a former small sand pit, the sand rim remains in quite good to excellent condition. Much bare sand is present, and there are stunted longleaf pines (*Pinus palustris*) in places, possibly fairly old trees that have had retarded growth due to the harsh conditions. Turkey oaks (*Quercus laevis*) are common, at least locally. Wiregrass (*Aristida stricta*) is scattered, but not fruiting. The State Endangered Pickering's dawnflower (*Stylisma pickeringii* var. *pickeringii*) is common in the openings between oak stands. Other common herbs and low shrubs include poor-Joe (*Diodia teres*), poison-oak (*Toxicodendron pubescens*), and wireplant (*Stipulicida setacea*). Growing in sandy openings close to a railroad track at the eastern edge of the barrens is Michaux's whitlow-wort (*Paronychia herniarioides*); 20-30 clumps or mats of this prostrate herb were discovered by the author during the inventory. This is the first documented record for the state, although Andre Michaux in the late 18th Century

reported the species at a vague location between Fayetteville and Florence, apparently in North Carolina.

To the north of the Sand Barren is a Xeric Sandhill Scrub community, where all oaks are turkey oaks. Just to the west of the barrens is a former sand pit, but there is no evidence of sand mining in perhaps 5-10 years or longer. To the northwest of the pit, the bay rim is at its most pristine, extending in good condition for 10 or more acres. Pickering's daisy is a dominant ground cover in many areas, and dwarf huckleberry (*Gaylussacia dumosa*) is common. Longleaf pines are scattered, and turkey oak is common but does not form dense stands. Bare sand is widespread.

Along the western edge of the sand rim, the vegetation transitions to a less xeric condition, where a Mesic Pine Flatwoods natural community is present. Dense shrubs are common: staggerbush (*Lyonia mariana*), sweet pepperbush (*Clethra alnifolia*), dangleberry (*Gaylussacia frondosa*), inkberry (*Ilex glabra*), and others. A few small openings contain herbs such as meadow-beauties (*Rhexia alifanum*, *R. mariana*), mountain-mint (*Pycnanthemum flexuosum*), and various composites. Wetland trees such as pond pine (*Pinus serotina*) and pond-cypress are present, but they are infrequent. These flatwoods grade gradually to the east (south of the barrens) into Pine/Scrub Oak Sandhill (Mixed Oak variant). Beneath the longleaf pines are many bluejack oaks (*Q. incana*), and staggerbush is a very common shrub. The herb diversity is fairly high in this sandhill community.

PROTECTION AND MANAGEMENT: Essentially all of the sand rim, and most of the bay proper, are in a single private ownership. The natural area is unprotected. As this is one of the few natural areas in the county of State significance that remain unprotected (or at least not in Federal or State ownership), this site is a very high priority for protection. A preserve design (Kelly 1992) was conducted on the natural area more than a decade ago, so the site's importance has been known to conservation agencies/organizations for many years.

The natural area has weathered some disturbances – an old sand pit and ATV usage – rather well, as a Sand Barren tends not to be heavily vegetated, and plant succession proceeds slowly. As a result, long-term fire suppression has not overly impacted the site; a more mesic longleaf pine site would be heavily impacted by hardwood succession or loblolly pine invasion. Nonetheless, the lack of a prescribed burn in over a decade has resulted in some plant diversity loss in the ecotone areas, such as in the Mesic Pine Flatwoods and Pine/Scrub Oak Sandhill communities. Not only would a burn help the ecotone, it would help thin the loblolly pine stand in the bay proper, but the vegetation there is probably too dense without some thinning of trees and shrubs prior to a burn.

Of course, the sand rim needs to be protected from any future sand mining operations. Use of ATVs should be discouraged, though this activity likely will continue, at least sporadically.

NATURAL COMMUNITIES: Sand Barren, Pine/Scrub Oak Sandhill (Mixed Oak variant), Xeric Sandhill Scrub, Mesic Pine Flatwoods

RARE PLANTS: Michaux's whitlow-wort (*Paronychia herniarioides*), Pickering's dawnflower (*Stylisma pickeringii* var. *pickeringii*); Watch List – Virginia marbleseed (*Onosmodium virginianum*)

RARE ANIMALS: None known

REFERENCES:

Carter, J.H., III, and J.H. Moore. 1989. Site survey report: Green Pond. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

Kelly, A.W. 1992. Green Pond Preserve Design. Report prepared for the North Carolina Chapter of The Nature Conservancy.

LeGrand, H. 2003. Site report: Green Pond Bay Rim. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

LYTCH'S POND

Site Number: 27

Size: 89 acres

Site Significance: County

Quadrangles: McColl, Gibson

Ownership: private

SIGNIFICANT FEATURES: Lytch's Pond is one of the larger millponds in the county and contains a representative example of Coastal Plain Semipermanent Impoundment natural community.

LANDSCAPE RELATIONSHIPS: The site is not located near any other natural areas identified in this report. The nearest is Scotch Meadows Bay Complex, 4 miles to the south. Richmond Mill Natural Area and Green Pond Bay Rim are roughly 6 miles to the north and northwest, respectively.

SITE DESCRIPTION: Lytch's Pond is a millpond located on Gum Swamp, a few miles southwest of Laurinburg. X-Way Road (SR 1108) runs alongside the dam, which is on the northwest side of the road. The open water of the pond is roughly 0.25 mile from road to the upper end, and roughly 0.20 mile across (from southwest to northeast).

Perhaps 20% of the pond is covered in medium-height trees; swamp tupelo (*Nyssa biflora*) is the most common tree, but pond-cypress (*Taxodium ascendens*) is numerous. Red maple (*Acer rubrum*) is also present in the pond. Below the trees are clumps of shrubs, with sweet-spices (*Itea virginica*) being dominant, but with shining fetterbush (*Lyonia lucida*) and elderberry (*Sambucus canadensis*) also present. Herb species around the base of the clumps include broadleaf cattail (*Typha latifolia*) and several smartweed/tearthumb (*Polygonum* spp.) species. Floating vegetation, at least along the margins, consist of narrowleaf cowlily (*Nuphar luteum* var. *sagittifolia*) and pondweed (*Potamogeton* sp.).

The swampy vegetation along the southwestern end of the pond consists of swamp tupelo as the dominant tree, along with red maple and sweetgum (*Liquidambar styraciflua*). Redbay (*Persea palustris*), sweetbay magnolia (*Magnolia virginiana*), and titi (*Cyrilla racemiflora*) are in the understory. American snowbell (*Styrax americana*) is a shrub in the wetland, and greenbrier (*Smilax rotundifolia*) is a common vine. A few clumps of mistletoe (*Phoradendron serotinum*) are present in the canopy.

The vegetation at the upper end of the pond was not surveyed. However, it must be assumed that swamp tupelo is the dominant tree in the floodplain of Gum Swamp just above the pond.

The pond is likely important for waterfowl and other aquatic wildlife. However, feral Canada geese (*Branta canadensis*) nest at the pond.

PROTECTION AND MANAGEMENT: The pond and the adjacent Gum Swamp floodplain are in a single private ownership. There is no formal protection for the pond. The pond might be a suitable acquisition/protection project for the local county government, in part because of the potential for recreational activities.

The pond is undoubtedly used for occasional fishing and recreational boating/canoeing but is not open to the public. Unlike Johns Pond, the water of Lytch's Pond appears to be reasonably free of choking floating or submerged vegetation. However, such vegetation are always potential problems at millponds (or other ponds and lakes with essentially standing water).

NATURAL COMMUNITIES: Coastal Plain Semipermanent Impoundment

RARE PLANTS: None known

RARE ANIMALS: None known

REFERENCES:

LeGrand, H. 2004. Site report: Lytch's Pond. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

JOHNS POND/LEITH CREEK SWAMP

Site Number: 28

Size: 236 acres

Site Significance: County

Quadrangle: Johns

Ownership: private (includes U.S. Fish & Wildlife Service easement)

SIGNIFICANT FEATURES: The site contains apparently the second largest millpond in Scotland County. A pair of osprey (*Pandion haliaetus*) nests at the millpond; the species nests quite locally in the interior of the state. The pond contains a good example of Coastal Plain Semipermanent Impoundment natural community. The swamp of Leith Creek above the lake is very scenic and is a Cypress-Gum Swamp (Blackwater subtype) community.

LANDSCAPE RELATIONSHIPS: The site lies about 4 miles northeast of Stateline Prairie Bay and about 3.5 miles east-northeast of Good News Bay. Shoe Heel Creek Floodplain, at its closest, lies about 4 miles to the northeast of Johns Pond.

SITE DESCRIPTION: Johns Pond, so named after the nearby community of Johns, was built as a grist mill in 1840. Over the past 160 years, the dam broke twice (1929 and the late 1960's), but it was re-built each time. The pond/dam was still being used to grind corn, as of the 1950's; however, the mill today is abandoned (though it might have restoration potential for historic purposes). The pond contains mostly open water in the southern portions, toward the dam, with scattered mature (though not tall) pond-cypress (*Taxodium ascendens*). Considerable floating vegetation covers much of the "open" water; duckweeds (*Lemna* spp.), floating pennywort (*Hydrocotyle ranunculoides*), and mosquito-fern (*Azolla caroliniana*) are abundant. Beneath the surface, hornwort or coontail (*Ceratophyllum demersum*) is abundant, as well. A few bladderworts (*Utricularia biflora*) are present on the surface. The knees and bases of the cypresses contain a great array of shrubs and herbs; common shrubs include sweet-spires (*Itea virginica*), titi (*Cyrilla racemiflora*), waxmyrtle (*Myrica cerifera*), buttonbush (*Cephalanthus occidentalis*), and swamp doghobble (*Leucothoe racemosa*). Poison-ivy (*Toxicodendron radicans*) is also very common, as a vine; and sapling red maples (*Acer rubrum*) are numerous. Spanish-moss (*Tillandsia usneoides*) is an abundant epiphyte. Common herbs are marsh St. John's-wort (*Triadenum walteri*), false nettle (*Boehmeria cylindrica*), and smartweed (*Polygonum punctatum*).

The upper portion of the pond changes in character, as swamp tupelo (*Nyssa biflora*) mixes with the cypress, and the tupelo gradually replaces the cypress as one goes farther into the floodplain. The floodplain forest along Leith Creek is a Cypress-Gum Swamp (Blackwater subtype); it is mature and dominated by swamp tupelo near the stream channel, but is mixed with tuliptree (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), and a few other species closer to the margins. Red maple is common in the understory. There is a very rich shrub diversity in the shallow water, and cane (*Arundinaria gigantea*) occurs in local patches. The uncommon

American snowbell (*Styrax americana*) is also present. The herb layer contains mostly various ferns.

The pond contains probably the county's only known nest of osprey (*Pandion haliaetus*), which nests only at scattered large millponds and reservoirs away from the tidewater zone. Great blue herons (*Ardea herodias*) are frequent at the ponds, and though they perhaps nest deep in the swamp, no nests have yet been found. Wood ducks (*Aix sponsa*) are present all year at the pond, and other waterfowl are present at various seasons. Other wildlife abound at the pond and swamp, including woodpeckers, barred owls (*Strix varia*), red-shouldered hawks (*Buteo lineatus*), and river otter (*Lutra canadensis*).

PROTECTION AND MANAGEMENT: The entire millpond and the floodplain of Leith Creek north to Old Maxton Road (SR 1619) is in a single private ownership. The northern 50 acres of this 169-acre tract was placed in a perpetual conservation easement by the Livingston family to the U.S. Fish and Wildlife Service in 2004. This easement contains floodplain forest but not the millpond. Fish and Wildlife Service staff are encouraging the placement of an easement over the entire 169 acres, or at least the majority of it so that the pond can be protected.

The pond was frequently used for fishing and boating for pleasure; a fee was charged to the public for such activities. Now, the pond is used mainly by family members and friends/guests of the family.

A fertilizer plant above the tract was responsible for considerable blooms of duckweed, but this problem diminished after the plant closed in the 1980's. However, since around 2000, there have been several sewage spills by the City of Laurinburg into Leith Creek, and these spills caused the dense submerged carpet of coontail and surface carpet of pennywort. Dead fish were noticed, and attempts to boat/canoe on the pond became extremely difficult. As a result, the owners introduced sterile grass carp to feed on the vegetation, with only moderate success. Though strong winds and flooding of Leith Creek help to open up the waters of the pond, this open water rather quickly closes in during calmer and drier conditions. The owners are discussing the potential of dredging of the pond to remove the aquatic vegetation (for boating/fishing reasons), though such removal could impact native aquatic plants.

Exotic wetland and aquatic plants are appearing in recent years. A few sprigs of parrot-feather (*Myriophyllum brasiliense*) have appeared in the floating mats on Johns Pond. The swamp has much murdannia (*Murdannia keisak*), especially near Old Maxton Road. Privet (*Ligustrum sinense*) is quite dense in the drier portions of the floodplain, at least close to the road.

NATURAL COMMUNITIES: Coastal Plain Semipermanent Impoundment, Cypress-Gum Swamp (Blackwater subtype)

RARE PLANTS: None known

RARE ANIMALS: None known

REFERENCES:

- LeGrand, H.E., Jr. 2004. Site report: Johns Pond/Leith Creek Swamp. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- Livingston, M. 2004. Johns Pond Water Quality History. Unpublished report.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

SCOTCH MEADOWS BAY COMPLEX

Site Number: 29

Size: 125 acres

Site Significance: Regional

Quadrangle: McColl

Ownership: multiple private

SIGNIFICANT FEATURES: The site contains a degraded example of a clay-based Carolina bay, plus a much larger bay that appears to be peat-based, with pocosin vegetation. The clay-based bay contains several rare plants – the State Threatened and Federal Species of Concern awned meadow-beauty (*Rhexia aristosa*) and the Significantly Rare small-headed marsh elder (*Iva microcephala*), plus a Watch List species. A rare butterfly – King’s hairstreak (*Satyrrium kingi*) – is known from the larger bay.

LANDSCAPE RELATIONSHIPS: This site is located roughly 2.5 miles west of Good News Bay; Stateline Prairie Bay is located roughly 3 miles to the southeast.

SITE DESCRIPTION: This natural area consists of three Carolina bays amid a residential development. The northern bay, hereby called Kerrimur Bay (after the road name to the south) and formerly called Chorus (Kneedeep) Bay, is now a somewhat degraded clay-based Carolina bay, of the Cypress Savanna (Depression Meadow variant) type. Formerly, it ponded water for much of the year, but now it is dry most of the year and contains a middle-aged stand of loblolly pines (*Pinus taeda*) in the northern half of the bay. The southern and deeper portion is still treeless – trees such as pond-cypress (*Taxodium ascendens*) must have grown in the pond at some time – and covered with dense stands of herbs such as maidencane (*Panicum hemitomon*). Other common herbs include the small-headed marsh elder (*Iva microcephala*) and goldenrod (*Solidago microcephala*). The northern and western rim of the bay contains a moderate population of awned meadow-beauty (*Rhexia aristosa*), whereas the Watch List white doll’s-daisy (*Boltonia asteroides*) is fairly common in the southern portion.

A small bay to the southwest of Kerrimur Bay is quite degraded and is cut-over. However, there is a much larger bay to its south, hereby called Carnoustie Bay for the road along its northeastern rim. Unlike Kerrimur Bay, this large bay has a scrubby woods on the northeast side, between the bay and the road; all of the “scrub oak” species are present – turkey (*Quercus laevis*), bluejack (*Q. incana*), scrub post (*Q. margaretta*), and blackjack (*Q. marilandica*). The bay itself contains a mix of scattered loblolly pines and pond pines (*Pinus serotina*), and a dense shrub layer typical of pocosins. It is tentatively considered as the newly “created” Coastal Plain Depression Swamp” natural community. Titi (*Cyrilla racemiflora*) is quite common, and other pocosin species are present, such as redbay (*Persea palustris*), sweetbay magnolia (*Magnolia virginiana*), shining fetterbush (*Lyonia lucida*), big gallberry (*Ilex coriacea*), and sweet pepperbush (*Clethra alnifolia*). Shrubs of note include honey-cups (*Zenobia pulverulenta*) and clammy azalea (*Rhododendron viscosum*). The Significantly Rare King’s hairstreak (*Satyrrium kingi*) butterfly

was seen on the site visit; its hostplant is sweetleaf (*Symplocos tinctoria*), which is widespread in the bay.

PROTECTION AND MANAGEMENT: These bays are in private ownership and have no protection. Kerrimur Bay, by itself, is of Regional significance and is the primary protection interest. Carnoustie Bay is of County significance, as a large bay – roughly 0.5 x 0.3 miles in size – that contains pocosin vegetation.

Protection is urgently needed, particularly of Kerrimur Bay, as over the next decade or two the bay likely will become a loblolly pine forest. Cutting of the pines and other woody vegetation is critical to save Kerrimur Bay. Measures to raise the water table or otherwise alter the hydrology to make the bay wetter seem to be impractical. Also, there are a few ATV trails running through the bay, including the open portion with the rare plants. As long as vehicle users stay to the existing trails, there may be few impacts; however, it is expected that the ATVs will be driven all over the bay at some point, and thus efforts should be made to restrict these vehicles from the bay.

The largest bay appears to be somewhat fire-adapted and could use burning. It likely has had selective timber harvest, explaining the somewhat open canopy. Because Carnoustie Bay is surrounded by development on the east, burning of it might be difficult; however, at the present time there are no residences to the south and west – only various fields and woodlots.

NATURAL COMMUNITIES: Cypress Savanna (Depression Meadow variant) [probably a former Small Depression Pond], Coastal Plain Depression Swamp

RARE PLANTS: small-headed marsh elder (*Iva microcephala*), awned meadow-beauty (*Rhexia aristosa*); Watch List – white doll’s-daisy (*Boltonia asteroides*)

RARE ANIMALS: King’s hairstreak (*Satyrium kingi*)

REFERENCES:

- LeGrand, H. 2004. Site report: Chorus Bay and Scotch Meadows Bay/Pinewoods. N.C. Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh.
- Nifong, T.D. 1982. The “Clay Subsoil” Carolina Bays of North Carolina. The Nature Conservancy.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

GOOD NEWS BAY

Site Number: 30

Size: 7 acres

Site Significance: Regional

Quadrangle: Johns

Ownership: private

SIGNIFICANT FEATURES: This is one of the few clay-based Carolina bays – Cypress Savanna (Depression Meadow variant) natural community – still in fair to mediocre condition in Scotland County, and as such is one of the better ones in the state. Though its hydrology has been degraded over the past few decades, it still retains one of the larger state populations of the Significantly Rare limesink dog-fennel (*Eupatorium leptophyllum*). Several other rare plants have previously been reported from the bay.

LANDSCAPE RELATIONSHIPS: This natural area lies about 1.5 miles north of Stateline Prairie Bay. The next nearest natural area is roughly 5 miles to the west – Scotch Meadows Bay Complex.

SITE DESCRIPTION: This is one of the relatively few clay-based Carolina bays remaining in fairly good condition in Scotland County. However, over the past 20-25 years, it has been considerably degraded in terms of its altered hydrology. Around 1980, the bay held up to two acres of water in its center. At that time, much of the center was open water and the remainder along the margins was dominated by southern cutgrass (*Leersia hexandra*) and bladderwort (*Utricularia inflata*) (Lynch 1980). The pond fringe was dominated by the State Threatened and Federal Species of Concern awned meadow-beauty (*Rhexia aristosa*) and the Watch List one-flower hardscale (*Sclerolepis uniflora*). The Significantly Rare branched hedge-hyssop (*Gratiola ramosa*) was discovered in 1979. In later years two additional Significantly Rare plants were discovered: shrubby seedbox (*Ludwigia suffruticosa*) and Bosc's bluet (*Oldenlandia boscii*).

Sadly, in 2004 the bay seems never to form a pond, and for much of the year even the middle is dry. After heavy rains, the soil is damp. The bay is still reasonably treeless, but loblolly pines (*Pinus taeda*) grow on the bay rim, and a few hardwood seedlings have taken sprout in the bay. Various grasses and a dense stand of bushy aster (*Aster dumosus*) dominate the bay. A variety of composites are present near the bay rim, among which is the limesink dog-fennel (*Eupatorium leptophyllum*), which is quite common (hundreds seen in fall 2004). However, no other rare plants could be located on two site visits in 2004. NOTE: Because the bay no longer seems to contain *Rhexia* (the meadow-beauty), and because the NC NHP prefers to have sitenames be based on places (rivers, mountains, towns, roads, churches, schools, etc.) that are named on topographic or road maps, the sitename has hereby been changed from Rhexia Bay to Good News Bay. The alternative name of the site was based on the name of a nearby church – the Good News Church, and this is new sitename chosen for this report.

PROTECTION AND MANAGEMENT: The bay is in private ownership and has no protection. Protection such as acquisition by a conservation entity is urgently needed, as over the next decade or two the bay likely will become a thicket of hardwood and/or pine saplings unless measures are taken to cut any woody vegetation. Measures to raise the water table or otherwise alter the hydrology to make the bay wetter seem to be impractical.

NATURAL COMMUNITIES: Cypress Savanna (Depression Meadow variant)

RARE PLANTS: limesink dog-fennel (*Eupatorium leptophyllum*), branched hedge-hyssop (*Gratiola ramosa*), shrubby seedbox (*Ludwigia suffruticosa*), Bosc's bluet (*Oldenlandia boscii*), awned meadow-beauty (*Rhexia aristosa*); Watch List -- one-flower hardscale (*Sclerolepis uniflora*)

RARE ANIMALS: None known

REFERENCES:

- Carter, J.H., III. 1979. "Unnamed Carolina bay". Carolina Bay site visit report. N.C. Natural Heritage Program.
- LeGrand, H. 2004. Unpublished notes. N.C. Natural Heritage Program.
- Lynch, J.M. 1980. North Carolina Natural Areas Preserve Design Study: Rhexia Bay. The Nature Conservancy.
- Nifong, T.D. 1982. The "Clay Subsoil" Carolina Bays of North Carolina. The Nature Conservancy.

For the protection of sensitive species this map has been deleted from this document and is viewable only on the DoD side of the Denix website.

Scotland County Natural Areas Inventory

STATELINE PRAIRIE BAY

Site Number: 31

Size: 34 acres (18 in North Carolina)

Site Significance: State

Quadrangle: Johns

Ownership: The Nature Conservancy, private

SIGNIFICANT FEATURES: This is an unusual Carolina bay that is open rather than forested, one of just a few grass-sedge “meadows” in the state; it is considered as a Cypress Savanna (Depression Meadow variant) natural community. It contains a very diverse flora, including a number of rare plants; two are Federal Species of Concern – Boykin’s lobelia (*Lobelia boykinii*) and awned meadow-beauty (*Rhexia aristosa*). The bay is also important for amphibian breeding, and two rare salamanders and one rare frog are known from the site.

LANDSCAPE RELATIONSHIPS: This natural area lies about 1.5 miles south of Good News Bay, and nearly 3 miles southeast of the Scotch Meadows Bay Complex. However, there are few other significant natural areas in this southern part of the county.

SITE DESCRIPTION: Stateline Prairie Bay is named because it straddles the North Carolina/South Carolina line, with slightly more than half of the site in the former state. In fact, the state line and the bay’s northwest-southeast orientation are roughly parallel to each other. SR 1622 runs along the eastern edge of the bay and has “nipped off” the eastern rim and margin of the bay. The bay was apparently forested at one time, but it is now essentially herbaceous, though seedling/sapling loblolly pines (*Pinus taeda*) invade the bay during drought conditions. Generally, several inches to a foot of water cover the bay, particularly in winter and spring; however, when dry, the site resembles a weedy, old field.

This bay, considered to be a Cypress Savanna (Depression Meadow variant) natural community despite the current absence of cypresses, has a remarkably diverse flora. Two Federal Species of Concern are present in good numbers – Boykin’s lobelia (*Lobelia boykinii*) and awned meadow-beauty (*Rhexia aristosa*); the former has its best state population here. The bay also contains, by far, the state’s largest population of water dawnflower (*Stylisma aquatica*); and it is also one of the few reported sites in the state for Leavenworth’s goldenrod (*Solidago leavenworthii*). The state’s only known population of pineland triodia (*Triodia ambiguus*) occurs in this bay.

Because the bay retains water for most of the year, and is free of fish which might eat eggs and larvae of amphibians, it is a critical area for frog and salamander breeding. The State Threatened eastern tiger salamander (*Ambystoma tigrinum*) occurs here.

PROTECTION AND MANAGEMENT: The Nature Conservancy owns approximately 60 acres of the bay and surrounding woods, 50 of which are in South Carolina. The 10 acres owned by the Conservancy in North Carolina are a Dedicated State Nature Preserve. However, the

remaining 8 acres of the site in North Carolina are in other private ownership and are not protected.

This bay tends to get invaded by young loblolly pines, and probably other “weedy” tree and shrub species, fairly frequently, at least during drought conditions. TNC staff have hand-cut saplings to keep the pines from invading; woody plants shade out herbaceous species and more rapidly draw down the water level in the bay than do herbaceous plants. Some program of burning is likely also needed. Some ATV use has been noted in the past in the bay and on the rims. Also, as the site has many homes close to the bay, there may be concern about trampling through over-visitation of the bay, at least in the near future.

NATURAL COMMUNITIES: Cypress Savanna (Depression Meadow variant)

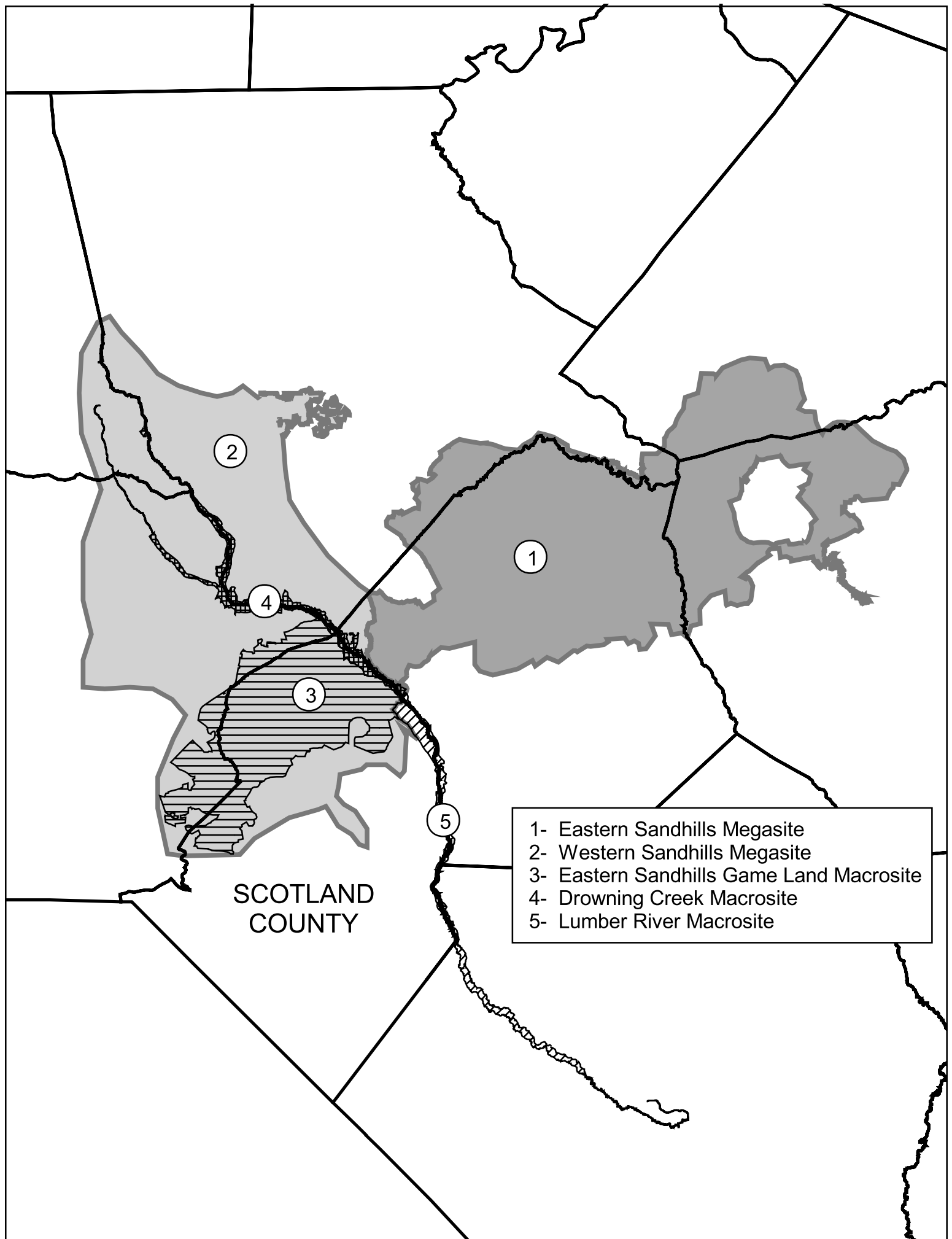
RARE PLANTS: branched gerardia (*Agalinis virgata*), limesink dog-fennel (*Eupatorium leptophyllum*), small-headed marsh elder (*Iva microcephala*), Boykin’s lobelia (*Lobelia boykinii*), shrubby seedbox (*Ludwigia suffruticosa*), southeastern panic grass (*Panicum tenerum*), awned meadow-beauty (*Rhexia aristosa*), Georgia nutrush (*Scleria georgiana*), netted nutrush (*Scleria reticularis*), Leavenworth’s goldenrod (*Solidago leavenworthii*), water dawnflower (*Stylisma aquatica*), pineland triodia (*Tridens ambiguus*)

RARE ANIMALS: eastern tiger salamander (*Ambystoma tigrinum*), dwarf salamander - silver morph (*Eurycea quadridigitata* pop. 1), ornate chorus frog (*Pseudacris ornata*)

REFERENCES:

- Carter, J.H., III. 1978. “State-line Prairie”. Carolina Bay site visit report. N.C. Natural Heritage Program.
- Lynch, J.M. 1980. North Carolina Natural Areas Preserve Design Study: State-line Prairie Bay. The Nature Conservancy.
- Nifong, T.D. 1982. The “Clay Subsoil” Carolina Bays of North Carolina. The Nature Conservancy.

APPENDIX



Appendix. Megasites and macrosites in Scotland County. The megasites are shown in solid gray shadings. The macrosites are hatched.

Eastern Sandhills Megasite. This large area incorporates most of the eastern half of the Sandhills physiographic region of North Carolina, primarily Fort Bragg Military Reservation. It borders Scotland County, on the east side of Drowning Creek.

Western Sandhills Megasite. This large area incorporates most of the western half of the Sandhills physiographic region of North Carolina. The area contains three macrosites: Eastern Sandhills Game Land Macrosite (primarily in Scotland County), Western Sandhills Game Land Macrosite (wholly in Richmond County and not shown on the map), and Northern Sandhills Macrosite (wholly in Moore County and not shown on the map). This megasite is separated from the Eastern Sandhills Megasite mainly by Drowning Creek (and also by Quewhiffle Creek). [The Drowning Creek Macrosite, a separate macrosite not a part of this megasite, passes through the Western Sandhills Megasite.]

Eastern Sandhills Game Land Macrosite. This is the only one of the three macrosites within the Western Sandhills Megasite that is located in Scotland County. It incorporates all of Camp Mackall and nearly all of the Sandhills Game Land tracts lying southeast of US 1, which is the dividing line between this macrosite and the Western Sandhills Game Land Macrosite.

Drowning Creek Macrosite. This narrow macrosite incorporates the floodplains of Drowning Creek, Naked Creek, and several other tributaries. Though it passes through the Western Sandhills Megasite, it is not included within that megasite and is more closely related to the Lumber River Macrosite immediately downstream.

Lumber River Macrosite. This narrow macrosite incorporates the floodplain of the Lumber River and abuts the Drowning Creek Macrosite. It contains one block of Sandhills Game Land and the Chalk Banks section of Lumber River State Park.